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AMERICAN JOURNAL of PHARMACY

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A Record of the Progress of Pharmacy and the Allied Sciences

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THE AMERICAN
JOURNAL OF PHARMACY

VOL. 99 AUGUST, 1927 No. 8

EDITORIAL

MUCH MORE DIGNIFIED—

MUCH MORE dignified—much more becoming—and much more useful—than the all-too-frequent run of drug store newspaper publicity—is the advertisement printed below.

Of course the cynic will say—"that's only done for *effect*"—to which we react with the *fact* that the *effect* in this case, is very good indeed.

And certainly, it is an "effect" that redounds to the benefit, not only of the advertisers, but to the profession generally.

How much more respect is invited by such a display of spirit and ethics than by some of the ridiculous patent medicine advertisements —or sale notices of cut-rate drugs and ukuleles—displayed over the signature or store mark of misguided druggist advertisers.

A casual glance at a local paper reveals the significant fact that the chain store at the main corner offers a special today—by way of a one-tube "static catcher"—yet, boxed in the regular place in the lay-out, is the legend

Prescriptions Carefully Compounded

To our way of thinking the more one-tube sets this store disposes of —the less time there will be for compounding prescriptions—and in that is a measure of public safety.

For the benefit of pharmacists who continue to believe in the ethics of their profession we reprint on the following page an unusual advertisement, that originally appeared in a Randolph, Va., paper.

A True Story--

He hurried in late one Sunday afternoon.
"Give me something for indigestion," he demanded. "My wife suffers from it constantly. Can't you suggest something to cure her?"
"What causes her indigestion?" the pharmacist asked.
"How do I know?" he replied in surprise.
"That's the point," the pharmacist explained. "How do you know—and how do we know? We have a score of remedies indicated in the treatment of indigestion, but almost every one of them is used to remedy a different systemic condition. We might recommend something which would do your wife more harm than good. The best thing for you to do is to consult a physician, have him get to the seat of the trouble and prescribe accordingly. It's too much responsibility for us to take."
He went out without his "counter prescription," but (we hope) to get his doctor's advice.

PLEASE DO NOT ASK US OUR OPINION IN THE TREATMENT OF ILLNESS. WE ARE DISPENSING PHARMACISTS—NOT PHYSICIANS. REMEMBER THAT EVEN WHAT YOU THINK TO BE MINOR COMPLAINTS MAY DEVELOP INTO SERIOUS TROUBLE UNLESS ARRESTED. THE ONLY SAFE, SURE, SANE WAY IS TO LET YOUR DOCTOR—NOT YOUR PHARMACIST—PRESCRIBE FOR YOU!

WM. T. VAN PELT **HARRY W. BROWN**

Van Pelt & Brown

"ONLY THE BEST"

MEDICAL ARTS PHARMACY

We Deliver Anywhere

SECOND AND FRANKLIN STREETS

Madison 1818

Physicians and the public generally would hold pharmacy and its practitioners in higher esteem, if such newspaper notices were the rule rather than the exception.

IVOR GRIFFITH.

ORIGINAL ARTICLES

PRESIDENTIAL ADDRESS*

By Joseph W. England

President of Pennsylvania Pharmaceutical Association

I BID YOU a most hearty welcome to the fiftieth annual meeting of the Pennsylvania Pharmaceutical Association.

Next to the work of colleges of pharmacy, probably the greatest factor in promoting the development of the practice of pharmacy in this country has been the work of organizations of pharmacists.

Joseph W. England

The movement for such organizations in Pennsylvania began in the cities, Philadelphia leading the way in 1872 with the establishment of the Pharmaceutical Examining Board of the City of Philadelphia, and it is a source of pride to me that my father, Robert England, served as treasurer of this board from its founding in 1872 until it was superseded by the Pennsylvania State Board of Pharmacy in 1887.

In the evolution of state pharmaceutical associations the incorporated and unincorporated bodies formed the national association in 1852, and about 1870 the movement to found state associations began to take form in some of the Western and Southern States. In 1877 such associations were already in existence in California, Connecticut, Georgia, Kansas, Maine, Michigan, New Hampshire, New Jersey, Rhode Island, South Carolina, Tennessee and Vermont, thirteen in all.

This was the signal for action in Pennsylvania. "A call for a meeting to found a Pennsylvania Pharmaceutical Association was held in Harrisburg, on February 26, 1878. Representatives were present from Philadelphia, Lancaster, Reading, Pottsville, Columbia, Chambersburg, Carlisle, Shippensburg and Harrisburg. The meeting was organized by electing as its president Charles A. Heinitsh, of

*Read before the Annual Meeting of the Pennsylvania Pharmaceutical Association, Buena Vista, Pa., June 21, 1927.

Lancaster, a widely known and universally esteemed pharmacist who had an apothecary shop in Lancaster which had been established in 1782 by his grandfather. Dr. J. A. Miller, of Harrisburg, was chosen secretary, and Joseph L. Lemberger, of Lebanon, treasurer. A constitution was adopted. The aim of the association was "to unite the educated and reputable pharmaceutists of the State, to improve the science and art of pharmacy and restrict the dispensing and sale of medicines to regularly educated druggists and apothecaries. The delegates adjourned to meet in Reading the following June. Many druggists assembled in Reading at that time; new members were elected. They were welcomed by the Mayor of the city. Plans were laid for obtaining a charter, delegates were named to attend the next meeting of the American Pharmaceutical Association; and needed state legislation and scientific subjects were discussed." (Amer. Jour. Phar., March-July, 1878.)

Of the twenty-two founders of the Pennsylvania Pharmaceutical Association all but two have gone into the Great Beyond and these are those Grand Old Men of Pennsylvania Pharmacy, Wilbur Fisk Horn, of Carlisle, and Joseph Lyon Lemberger, of Lebanon, both in the fiftieth year of their membership in the Association; and the latter for thirty-three years its treasurer. Let us pause for a moment and pay tribute to these men for their splendid loyalty and devotion to our profession. They have not lived in vain. They have "fought the good fight" and now "unashamed and unafraid" they face the sunset of their lives. God bless them!

The Pennsylvania Pharmaceutical Association has been a leader among leaders of state pharmaceutical associations, and its work for Pennsylvania Pharmacy during the past fifty years has been of incalculable value, not only to the retail practice of pharmacy, but to all the divisions of pharmaceutical endeavor—historical, educational, legislative, scientific, practical and commercial, and wholesale, retail and manufacturing.

HISTORY

It is not practicable to detail here the splendid history of our Association during the past fifty years, but it has been so rich in work and forms such a bright chapter in the history of American Pharmacy, that it seems to me, it would be highly desirable that the editor of *The Pennsylvania Pharmacist* prepare for publication an historical digest or narrative of the history of the Association in pamphlet form, or as a series of articles in *The Pennsylvania Pharmacist* during the coming year, and I would

recommend that this suggestion be referred to the Executive Committee with power to act.

EDUCATION

Fifty years ago there were fifteen colleges of pharmacy, now about seventy-five. The there were no definite entrance requirements in colleges for pharmacy students; now, four years of high school is required. Then, there were night classes and few colleges had laboratory work, and this latter was not obligatory; now the instruction is given in day classes, and night work is not accepted by State Boards of Pharmacy. Then there were only three branches taught in colleges of pharmacy—pharmacy, chemistry and materia medica—and no obligatory quiz instruction; now, with nine or ten branches and individualized instruction, some of the colleges have as many as forty-five teachers. Then the courses began in the fall and concluded in March; now the school year is eight to nine months long. Then the longest course was two years; now it embraces three college sessions. What a wonderful advance in fifty years, and no less wonderful has been the advance in pharmaceutical education exemplified by the many splendid pharmaceutical journals of the country, and the publications of the numerous pharmaceutical organizations, all of which constitute post-graduate courses in pharmaceutical education. A number of state organizations are now publishing monthly periodicals and it is to the credit of our organization that we have not been lagging. Our publication, *The Pennsylvania Pharmacist,* instituted under the administration of former President George F. Lee, and most ably edited by Secretary J. G. Noh, has proven to be of the greatest value in furthering the interests of Pennsylvania Pharmacy.

LEGISLATION

It seems hardly possible that fifty years ago we had no pharmacy laws outside of a few local laws and the Federal drug import law of 1848. But with the formation of state associations the progress of pharmaceutical legislation in the states was rapid. Beginning with Rhode Island and a few cities, including Philadelphia, the establishment of a system of registering, examining, and granting certificates of competency to pharmacists and their assistants by official boards spread over the country. Pennsylvania enacted its first state pharmacy law in 1887. Since then many laws and amendments have been enacted in the State for the practice of pharmacy, registration of pharmacies, sale of narcotics, adulteration and misbranding of drugs, use of wood alcohol

in medicinal and toilet articles, advertising of venereal remedies and the sale of drugs and poisons, etc.

Fifty years ago we did not have the Federal Food and Drug Act of 1906, the Harrison Narcotic Act of 1914, and the Prohibition Act of 1919, nor the many supplementary state acts on the same subjects. Nor did we have state prerequisite and pharmaceutical licensure laws.

And it should be a matter of deep pride with us that so many of our own members have taken such a prominent part, not only in securing the enactment of such progressive legislation by the Federal government and our own state, but also, in suggesting practicable methods for the administration of the laws.

It is pleasing to note, also, that the registration requirements of state boards of pharmacy, and the State Board of Pennsylvania stands in the front rank, are constantly advancing, and this is in the interest of better public health. Through the kind courtesy of H. C. Christensen, Secretary of the National Association of Boards of Pharmacy (May 12, 1927), I am in receipt of the following statement on state requirements:

"Forty-four (44) states now have high school graduation in force or to become in force either by law of ruling of Board or by virtue of requiring graduation from recognized schools or colleges of pharmacy which require high school graduation for entrance to courses.

"Thirty-three (33) states now have in force or to become in force provisions for colleges of pharmacy training—all excepting three, Iowa, Minnesota, and Michigan, require graduation. The three states named provide for two years of attendance at a college of pharmacy but not for graduation. Under the two-year college course this usually meant graduation, but not so under the present three-year course.

"California, Delaware and District of Columbia enacted legislation this year requiring college graduation. In Wisconsin a law requiring graduation is still pending and prospects for enactment are reported favorable. In Colorado, South Dakota and Texas college prerequisite legislation was defeated, chiefly it is reported, because the enactment of complete new pharmacy laws was attempted some of the provisions of which engendered opposition strong enough to defeat the proposed laws in each of these states.

"Texas reports that at a special session of the legislature of that state an attempt will now be made to amend the present law so as to require college graduation, instead of again trying to pass a new law."

SCIENCE

The science of pharmacy during the past fifty years, like all other sciences, has undergone wonderful development. We are proud of the fact that the members of our Association have been most productive in the number and quality of their scientific papers, as a perusal of our annual proceedings and pharmaceutical literature generally will show.

Science is based on research and the high lights in American pharmaceutical research during the past fifty years are thus enumerated by Professor Harry V. Arny (April 22, 1927):

"Squibb's work on percolation; Diehl's work on percolation; Maisch's work on pharmacognosy; Power's work on phytochemistry; Kremer's work on volatile oils; Rusby's work on drug plant explorations; Lloyd's work on adsorption and other colloidal phenomena; Schlotterbeck's work on alkaloids; Kraemer's work on powdered drugs; Newcomb's work on drug plant cultivation."

BIOLOGICAL MANUFACTURE

The most striking development in pharmacy during the past fifty years has been in the biological field and H. H. Whyte (April 25, 1927), thus gives the high lights of such development: "Half a century ago the only biological product in use was smallpox vaccine in an extremely crude and impure form, but it is doubtful if any of the innumerable biological products for the prevention, limitation and cure of disease have outclassed this, now obtainable in a highly purified form, in its relation to the public health, when the loathsome symptoms and sequelæ of smallpox are considered. A little more than thirty years ago, diphtheria antitoxin was introduced, which may be claimed to be outstanding in its relation to public health and welfare, and the more recent modification of toxin-antitoxin for prophylaxis. Recent researches have also resulted in preventive measures for typhoid fever and scarlet fever, and it is not expecting too much if, in the near future, a child in its early years, may receive one combined injection that will give it life-long protection against diphtheria, scarlet fever, measles and whooping-cough, the dreaded diseases of childhood which are responsible for the 40 per cent. of mortality of children under five years of age."

Merck and Company write me (April 28, 1927), that: "Perhaps the outstanding feature in the development in the manufacture of medicinal chemicals during the last fifty years is the improvement in methods of refinement whereby medicinal chemicals of much better quality are obtained than were possible formerly, this improvement being reflected in the much higher standards set by the U. S. P. standards, which formerly could not be met. Apart from the absolute methods of manufacture, although a part of such, is the development of more precise methods of testing and control of the quality of medicinal chemicals.

CHEMICAL MANUFACTURE

"As to medicinal chemicals as a whole, the most important developments have been the manufacture and introduction of preparations which may be regarded as specifics—*e. g.*, the newer arsenic and bismuth compounds for syphilis; coal tar dyes, as such or combined with silver, mercury, etc., as antiseptics; iodized or brominized compounds, and insoluble barium compounds for roentgenologic work; ethylhydrocupreine compounds for pneumonia; insulin and intarvin, for diabetes; and many more too numerous to mention."

Fifty years ago pharmaceutical manufacturing was still done, to a large degree at least, in the drug store; since then there have been radical changes, induced by economic conditions. F. W. Nitardy (April 25, 1927) details these, as follows: "(1) The taking-over of manufacturing activities largely by specialists, properly organized and equipped for such work; (2) the great complication and great increase in cost involved in manufacturing, due to accurate assaying and standardization of finished products; (3) making the U. S. P. and N. F. legal standards of the United States; (4) the effect of the food and drug laws, assay and standardization and concentration of manufacturing activities in well-equipped laboratories with a scientific staff, resulting in the production of better and more reliable products generally (although it must be admitted that such products were obtainable prior to the food and drug acts even though they were by no means general); (5) the development of labor saving machinery in manufacturing plants in order to meet conditions brought on by the war and to reduce costs; (6) the gradual elimination from materia medica of many not widely used drugs of questionable merit, thereby concentrating interest in better known, more reliable and more active drugs."

MANUFACTURING PHARMACY

Fifty years ago the retail drug business was conducted along very different lines than now. Many have been the changes, some for the better and some for the worse. I have asked F. E. W. Stedem what his impressions were as to the developments of the practice of pharmacy during the past fifty years and (April 21, 1927) his answer is:

RETAIL PHARMACY

> "Your question is interesting, both because the time involved is within the scope of my experience (October, 1875) and because it is a question of profound possibilities. I reflect on the things which your father and my old friend Edwin M. Boring regarded as essential to and for the practice of pharmacy and then contemplate the marvelous things that have been accomplished within fifty years and cannot give adequate expression to my wonderment at the greatness of it all! Take one great accomplishment—the aid given by pharmacy to the science and art of medicine in the development of preventive medicine, and the great central fact that because of this aid, certain diseases and ailments have become practically things of the past. Then, also, the great research work, largely the accomplishment of pharmacy and pharmacists, resulting in the production of a vast assortment of alkaloidal, glucosidal and synthetic armamentaria for the use of the medical profession. I am again lost in wonder at it all. Yet, my dear friend, how sad the contemplation of the multitude of junk shops now prevalent in the land masquerading as pharmacies and drug stores.
>
> "But pharmacy and pharmacists will emerge from all this. The force and causes of the greatness of it all, will also be equal to the task of regeneration, and again drug stores will be drug stores and pharmacists will be pharmacists, and I hope to live long enough to realize the prediction that I have made many times in recent years, 'That at no time in the history of the profession of pharmacy in this country has there been a time when an individual, properly trained and educated, could so surely and confidently look forward to ultimate success for all legitimate aspirations as now, RIGHT NOW!'"

And now I wish to dwell upon some of the more pressing problems that face the practice of pharmacy today in this state, as follows:

In my judgment, the most important forward step ever taken by this association has been the establishment of a permanent headquarters in Harrisburg, the capital of the State, on June 1, 1926, the engagement of a full time secretary, and the offering of the following services to the members of the Association: (1) An Infor-

mation Bureau with facilities for informing the members on legislative matters, Federal and State rules and regulations, prescription compounding, commercial problems, prices, etc.; (2) Organized protection against bad legislation and means for the promotion of issues for the improvement of the profession; (3) a monthly journal *The Pennsylvania Pharmacist,* which furnishes the latest pharmaceutical news, new government rulings, valuable suggestions and ideas; (4) experienced aid in organizing local and county associations; (5) exchange of plans and ideas for better business; (6) an employment bureau for the benefit of both the employer and employee; (7) better co-operation between pharmacist and the law; (8) closer relationship between retailer, wholesaler, and manufacturer; (9) presentation of business and speculative opportunities; (10) development of plans for the correction of trade abuses and unfair prices; (11) organized campaign for professional recognition.

The results have been most satisfactory. Not only this, but where, formerly, the State Association had no local contacts, it has affiliated it with twenty-two local pharmaceutical associations in the sixty-seven counties of the State, and it is only a question of time until every county will be affiliated. The importance of a 100 per cent. affiliation is this: The most important work, probably, of the Association is legislative, advocating good legislation and opposing bad. There are sixty-seven counties with 207 members in the House of Representatives, and fifty Senators. Philadelphia County has about forty-one members in the House, and Allegheny County has about twenty-seven members, but neither one of these counties, or both, can influence enough legislators to secure legislation. As ex-President George F. Lee said last year: "We have at Philadelphia and Pittsburgh two of the strongest local associations in the United States, and the Pennsylvania Pharmaceutical Association may be justly proud of them," but this is not enough. The country pharmacists of the State are closer to the legislators than the city pharmacists; and if we have sufficient contacts with the country members of the State, through county affiliations, as well as the two big counties, the combined influence will far greater than any county or counties alone.

Pennsylvania pharmacy must present a united front, and to do this it must represent the entire pharmaceutical interests of the State and the logical body to do this is the Pennsylvania Pharmaceutical

Association, and not any county or counties organization working separately. With such an organization, Pennsylvania pharmacy only can exert the influence it can and should.

Nine bills affecting Pennsylvania Pharmacy were introduced at the recent session of the Pennsylvania legislature. Through the energetic work of our Association, especially by the Committee on Legislation and Secretary Noh, three desirable bills were passed and six undesirable ones were killed or died in committee. The bills enacted were: H. R. 654 (Benzoate Bill), H. R. 1295 (U. S. P. and N. F. Bill), H. R. 1370 (Drug Store Ownership Bill).

I will not report further on the work of the Association during the past year. This was given in detail by Secretary Noh in his report, but I do wish to express my personal appreciation of the reorganization of the Traveling Men's Auxiliary under the leadership of Frank W. Smith, Elton B. Andrews, Raymond Hendrickson and others, and trust that this splendid organization, which has done so much for us in the past, will continue its good work, to the benefit of both organizations. The Traveling Men's Auxiliary is essential to the Pennsylvania Pharmaceutical Association and the Pennsylvania Pharmaceutical Association is essential to the Traveling Men's Auxiliary, and the work of the latter is sincerely appreciated.

DRUG STORE OWNERSHIP

Probably the most important pharmacy law ever enacted by the State of Pennsylvania, excepting the basic pharmacy law itself, has been the enactment by the Legislature of 1927 of the supplement to the Pharmacy Act of 1917 (H. R. 1370), or the so-called drug store ownership law, confining the ownership of pharmacies and drug stores to registered pharmacists. It is important for the reason that, for the first time in this State, a sharp legal distinction has been made between the practice of pharmacy by individual professional pharmacists, and the practice of pharmacy by commercial concerns whose business is primarily the sale of department store merchandise and incidentally the practice of pharmacy.

The bill was approved by Governor John S. Fisher—to whom the warmest praise is due for his fine judicial attitude—on Friday the thirteenth day of May! It excited, during its passage, widespread state interest, and attaches of the Governor's office have said brought pounds of correspondence for and against the bill, the largest in volume of any measure passed by the 1927 legislature.

The credit for this achievement is due primarily to our Committee on Legislation, especially to Chairman William L. Cliffe, who drafted the bill passed, and Secretary J. G. Noh, who worked unceasingly for its passage; to Charles H. Kramer, for his steady support, and to C. C. Campbell, Ambrose Hunsberger, George O. Yohe and J. C. Sims, all of whom made one or more trips to Harrisburg in the interest of the bills, and to many county and local associations who contributed to the success of the work, and to the splendid cooperation of our members throughout the State. We are indebted also, to Dr. Wilmer Krusen, Director of Public Health of Philadelphia and other leading members of the medical profession.

The Pennsylvania law is distinctly superior to the New York State Pharmacy Ownership Law of 1923 (Section 234 of the Public Health Law), which has a serious defect—it permits corporations who owned pharmacies or drug stores at the time of the passage of the law to "continue to own and conduct the same and establish and own *additional* pharmacies or drug stores." Our bill was framed to avoid such a "loophole" in the law. The New York law also permits "the widow, heir or next of kin of deceased owner to continue to own or conduct such registered pharmacy or drug store." Such a provision may mean the almost indefinite continuance of such stores, while our bill provides that

> "the administrator, executor or trustee of the estate of any deceased owner of a registered pharmacy or drug store may continue to own and conduct such pharmacy or drug store during the period necessary for the settlement of the estate."

The first objection that is always raised against a progressive law, by those opposed to it, is that it is unconstitutional, and drug store ownership laws are no exception to the rule.

The constitutionality of the New York Pharmacy Ownership Law of 1923 was attacked in New York State last year, and: "In the Matter of Application of Morris M. Tucker for a Peremptory Order of Mandamus against the New York State Board of Pharmacy," before the Supreme Court, Albany County, New York, Special Term, June, 1926, Justice Ellis J. Staley presiding, the following decision was made:

> "The petitioner questions the constitutionality of the act in question. The practice of pharmacy is of such a nature as to permit its regulation by the legislature. In enacting Section 234

of the Public Health Law I think that the legislature has adopted a reasonable regulation well within its authority under the constitution."

John A. Dixon, Secretary of the New York State Board of Pharmacy writes me (April 20, 1927) as follows:

"This decision touches upon the constitutionality of the ownership law, because the question was raised by an appellant in a mandamus proceeding. It is the only court decision that has been rendered relative to the subject.

"Answering your question as to the success of the ownership law, you are advised that it is considered in this state very successful and has not been directly attacked in any case."

The constitutionality of similar legislation has been completely and emphatically sustained by a decision recently handed down by the Supreme Court of the United States in which the constitutionality of the Minnesota statute relating to and regulating the practice of dentistry within the state was questioned. (N. A. R. D. Journal, December 9, 1926.)

It may be claimed that the Pennsylvania Drug Store Ownership Law is unconstitutional because it restricts the sale of merchandise (as drugs) to a preferred class, but it should be particularly noted that *the law makes a sharp distinction between merchandising per se, and merchandising on a professional basis.* The law provides that commonly used household drugs or drug-merchandise, properly packed, may be sold by storekeepers generally as well as by pharmacists, but when the drug-merchandise is sold in a form that requires individualized, professional skill for its sale, such as bulk-drugs, poisons, prescriptions, etc., then it must be sold by pharmacists. This is in the interest of public safety, just as is the law that permits dispensing-physicians to sell, directly or indirectly, such merchandise to his patients.

The law will not drive the chain stores out of business or force the owners of such to be registered so long as they sell general drug merchandise, but it does require that all drug merchandise sold on a professional basis must be sold by professional men.

The enactment of drug store ownership laws is of the greatest public importance in preventing the submergence of the profession of pharmacy by commercialism, and promoting better pharmaceutical service, and better public health.

One of the most striking demonstrations of the money-value of the service of the Pennsylvania Pharmaceutical Association to the retail pharmacists of the State is to be found in the fact that its energetic protest against the enactment of Pennsylvania Senate Bill 573 resulted in the defeat of this measure.

ALCOHOL PERMIT LEGISLATION

This act was a supplement to the Alcohol Enforcement Act of 1923 and would have required registration, permits and bonds of retail pharmacists selling "alcohol or alcohol liquids." The cost of each permit would have been $100, and of each bond $100; or a total cost to the 4,000 retail pharmacists of the state of $800,000!

The purpose behind this legislation was laudable. It was to eliminate "bootleggers" from the practice of pharmacy, but the method proposed was impracticable. If the practice of pharmacy in Pennsylvania is menaced by bootleggers, either directly through individual pharmacists or indirectly through the management of stores by registered pharmacists, then the remedy would seem to be for the State Board of Pharmacy, acting under authority of Section 3 of the Supplement (No. 431), of May 26, 1921, to the Pharmacy Act of May 17, 1917,

> "to suspend or revoke any permit upon conviction for a second or any subsequent violation of any law of this Commonwealth or of the United States pertaining to the drug business or the sale of intoxicating liquors, *or for aiding or abetting in the violation of any such law.*"

The practice of pharmacy must be protected against demoralization by bootleggers and the State Board of Pharmacy can render no greater service to the public than by co-operating with the Federal and State governments and cancelling or suspending "pharmacy permits" not only for those who are convicted for a second or later violation of the liquor laws, but for those who aid or abet the violations of such law, as provided in the law.

The greatest evil in the drug business today is ruthless price cutting. It demoralizes business and does not ultimately benefit the consumer. There is probably no specific, but it should be possible to improve conditions by education and legislation, education of the public as to the facts, and legislation by Congress against unfair merchandising. We need "truth in business" as well as in the distribution of food,

PRICE PROTECTION

drugs and narcotics, so effectively protected by Federal and State laws.

There is unquestionably a strong public sentiment against price-fixing legislation and this is based on the fear that such legislation may lead to monopoly and extortion. But there can be no reasonable public objection to legislation for the establishment of sale prices for trade-marked articles based on actual costs plus reasonable profits.

The actual cost of an article to a dealer is not his purchase price, but his purchase price *plus* his cost of doing business, which latter does not, of course, include profit. If the dealer sells his goods at his purchase prices, he is losing money, because he is not getting all his costs. Researches in widely different sections of the country have shown that the operating costs in some 500 retail stores *based on sales* average about 28 per cent. which equals about 39 per cent. on costs. If, for example, a retail druggist buys an article for 67 cents and sells it for less than 93 cents he is losing money. He must sell it for more than 93 cents to make any profit.

The latest legislation suggested is a "Tentative Substitute for H. R. 11 of the Sixty-ninth Congress, Second Session." It is aimed "to protect trade-mark owners, distributors, and the public against injurious and uneconomic practices in the distribution of articles of standard quality under a distinguishing trade-mark, brand, or name."

Apropos of the subject of price protection Clyde Kelly (author of H. R. 11) says (General Bulletin, No. G-22, E. C. Brokmeyer, May 28, 1927):

> "The problem of protecting the price on standard trade-marked articles in competition with other articles of the same class is the biggest question before American business. Granting the right to the manufacturer of such a product is the greatest blow which can be struck against monopoly. The Standard Oil Company, the Tobacco Trust, and other great combinations won their control by price-cutting. They slashed rates until competitors were eliminated and then they raised the prices to recoup all losses.
>
> "This same practice is used by great retail establishments in luring customers with the idea that all their goods are sold at bargain rates on standard trade-marked articles. Of course, that is impossible and extortionate profits are made on unnamed and unidentified goods. The public pays the full cost of such practices.

> "Fair competition is always in the public interest. Price standardization means increased competition between honest manufacturers who desire to protect their good will. The automobile business is the classic example of price standardization. The manufacturer has named his price. It has been uniformly the history in the business that prices have been reduced and quality increased."

The whole subject of price protection, however, is of such vast and far-reaching importance to pharmacy that it should be made the subject of a comprehensive, systematic business research covering all phases of the problem and all sections of the country, and it is most interesting to note that the National Association of Retail Druggists, the American Association of Colleges of Pharmacy and the National Wholesale Druggists' Association, through duly appointed delegates, have organized the Druggists' Research Bureau, which will study problems of mutual concern to retailers, wholesalers and manufacturers, and which have asked the active co-operation of all state pharmaceutical associations, including our own.

I would therefore recommend that the Pennsylvania Pharmaceutical Association heartily endorse the Druggists' Research Bureau and direct its officials to co-operate with it in every way possible, as has been requested by the Druggists' Research Bureau.

BUSINESS PRINCIPLES

Ethics is the science of moral duty, or more broadly, the science of ideal human character, and business ethics or business principles is simply ethics applied to business. It is nothing more or less than the Golden Rule. We have our code of ethics of the American Pharmaceutical Association to govern our professional conduct, but we have no code to govern our business conduct. It is important that we have one. Price-cutting is only a phase of unfair trade practices; there are others.

In view of the present chaotic condition of business, with its many unfair practices, resulting in the demoralization, bankruptcy, and worse, all to the detriment of the public, the National Wholesale Druggists' Association suggests that our State Association, and other State associations, establish a Committee on Principles of Business Practice, to prepare a draft of a platform of business principles consisting of planks dealing specifically with trade practices that lead to destructive price cutting and other abuses, a preliminary draft of

the same to be presented at the next meeting of this Association; and I so recommend.

There has been considerable discussion recently on the subject of limiting the number of drug stores.

LIMITING DRUG STORES

Charles F. Kramer, Director of the Division of Drug Store Registration State Board of Pharmacy of Pennsylvania, writes me (March 22, 1927), that: "The number of drug stores registered in Pennsylvania for the past six fiscal years (June 30 to July 1) was 1921, 3403; 1922, 3578; 1923, 3666; 1924, 3794; 1925, 3942; 1926 (to date) 3985."

The increase for the six years was 600. In 1920, the population of the State of Pennsylvania, *Commerce and Industry* advises me, was 8,720,000, and in 1927, was 9,613,570, an increase of 10 per cent. A 10 per cent. increase in the number of drug stores for these six years would have been 340 as against the actual number of 600, or an excess of about 43 per year, which is not unduly large.

Shall the number of drug stores be legally limited? Personally I believe that Arthur S. Wardle, former president of the New York State Pharmaceutical Association senses the real situation when he says (*The Apothecary,* December, 1926),

> "There are three parties who will be vitally affected by this proposition—the colleges of pharmacy of the State, the licensed pharmacists, and the public. If the number of pharmacies is limited the first result will be a greatly reduced registration in the colleges. Naturally a young man or woman will consider very carefully before entering a college of pharmacy if there is any speculation as to his ability to own a pharmacy after graduation and licensing by the Board of Pharmacy. Diminish the registration in the colleges and you at once reduce the income of the colleges. The standard of our colleges would be lowered and the graduates would be less competent than at present. Limit the number of pharmacies and you immediately limit the number of employees needed. Lessen the demand for clerks and down goes the wages, and with it the standard of living correspondingly will be lowered. Immediately upon the enactment of any such legislation, medicine shops and drugless stores would spring up like mushrooms. What a wonderful thing this proposed limitation of stores would be for the established chain stores. They would immediately absorb as many of the existing stores as money could buy, especially those having a good location. If pharmacies are limited the next step will be the limitation of the items that may be sold in pharmacies."

It has been suggested that the number of drug stores be limited by limiting the number of students in colleges of pharmacy, but this would be suicidal for the colleges of pharmacy unless they had state appropriations or were sufficiently endowed to meet the loss of revenue induced by such action. Furthermore, if this were done, the results indicated by Mr. Wardle for the legal delimitation of drug stores would probably follow. We know what has happened to the general medical practice of the country by the excessive limitation of students in schools of medicine.

The most serious factor favoring an abnormal increase of drug stores are the chain and the bootlegging stores. The recently enacted drug store ownership law will, I believe, control the former and a better and more co-operative administration of the Federal and State prohibition laws, will ultimately correct the latter.

A FOUR-YEAR PHARMACY COURSE

At the last meeting of the American Association of Colleges of Pharmacy (which body represents about 60 per cent. of the colleges of pharmacy in the country), its president expressed the opinion that it would be only a few years before the Association *must* fix a definite date when a four-year course in pharmacy shall be the minimum requirement for graduation, and a committee was appointed to study the question, consisting of Professors Raabe, Rosaris, Schicks, Ziefle and Havenhill, four professors in universities and one in an agricultural college school of pharmacy.

If this question had only academic interest, it would not particularly concern retail pharmacists, but it has a direct bearing on the every-day practice of pharmacy.

It has been only two years since the three-year pharmacy course was inaugurated; and the question arises: "Is there any real need for a four-year course in Pharmacy?" Economically there is *not;* culturally there may be, as there has been a great increase of pharmaceutical knowledge during recent years. On the other hand, however, the courses of instruction in the colleges have been greatly lengthened in recent years, and the applications of such knowledge in the retail pharmacy have been greatly curtailed.

The ambition of the colleges to raise their courses of instruction to academic standards is commendable, but it should not be forgotten that the chief function of a college of pharmacy is *to teach students to practice pharmacy.* Culturally, the student cannot have too

much knowledge; economically, he can be over-educated for his daily work.

I believe that pharmacy colleges can well profit by the experience of medical colleges. In recent years these latter have radically limited the number of their students and increased their years of training to a total of eleven or twelve, of which *only* four years are spent in the medical college. But the medical colleges have gone too far. Today the whole country (outside of the cities) is crying aloud for general medical practitioners, and national medical leaders like Dr. William Allen Pusey, of Chicago, are earnestly pleading for a correction of this condition. Alba B. Johnson, president of the Board of Trustees of Jefferson Medical College of Philadelphia, recently stated (May 16, 1927) that

> "in the State of Pennsylvania the actual number of registered physicians is decreasing each year in spite of the rapidly growing population. This is a serious fact and one that must be faced."

Furthermore, the excessive development of medicine in certain of its sciences and its lack of development in the art of therapeutics, both physiologic and non-physiologic, have brought into being a great number of cults and methods of quackery and some religious systems of treating disease.

Especially significant is a recent article* by Dr. William J. Mayo, the internationally famous physician of Rochester, Minn., on "Medical Education for the General Practitioner" (*Jour. A. M. A.*, 1927, 1377), who states that when he was a medical student

> "Every teacher was a practitioner of medicine and every student *was taught to practice medicine. At present,"* he writes, *"the full time professional educator is largely in control of medical education,"* adding, "One should go to the educator for information, but not for advice. This is especially true in medical education. The actual practice of medicine must be taught by example as well as by precept."
>
> "Today," he continues, "we are suffering from too much knowledge, too widely diffused. We try to teach our medical students something of all the medical sciences. Without intending to criticize unkindly, I believe that we devote too much effort

*Read before the Annual Congress on Medical Education, Medical Licensure and Hospitals, February 14, 1927.

> in driving home detailed information and too little to the development of perspective. None of us here would pretend to a complete knowledge of even one subject and yet we work our medical students seven days in the week to give them a smattering of everything. Many of them, in trying to achieve the impossible, are burned-out mentally before they finish school. The detailed information we try so hard to give the medical student all can be obtained from books. We should teach him *how* to think and *where* to look for information, so that commencement will be what the term implies, the beginning of the study of medicine, rather than a consummation for medical practice."

If medical schools can cover the vast amount of subject matter they teach in four years, why should pharmacy schools with so much less matter to teach require four years? Three years is ample and any attempt to exact more is, in my opinion, entirely academic and not necessary to fit students to practice pharmacy.

APPOINTMENT OF MEMBERS OF STATE BOARD OF PHARMACY

The Pharmacy Law of New Jersey of March 19, 1901, provides under Section 1 (as amended P. L. 1918, Chapter 19), that the members of the Board of Pharmacy of the State of New Jersey shall be appointed by the Governor, and "the New Jersey Pharmaceutical Association may annually hereafter send to the Governor the names of three registered pharmacists engaged in the practice of pharmacy in this State, who shall have the qualifications of this act, of whom the Governor may appoint one to fill any vacancy in said Board."

Secretary Robert P. Fischelis, of the State Board of Pharmacy of New Jersey, writes me (May 13, 1927), that

> "the Governor is not compelled to select one of the three, but since the law has been passed no Governor has ever appointed any one to the Board who was not one of the three candidites submitted by the State Association."

I would recommend that our Committee on Legislation be authorized to prepare an amendment to the Pennsylvania Pharmacy Law along the lines of the New Jersey Pharmacy Law and secure its enactment if possible at the next session of the Pennsylvania Legislature.

THE SALE OF COMMONLY USED HOUSEHOLD DRUGS

The Pharmacy Law of Pennsylvania (1917, May 17, P. L. 208, 13), permits storekeepers in the state to lawfully sell "commonly used household drugs when the same are offered for sale or sold in packages which have been put up ready for sale to consumers by pharmacists, manufacturing pharmacists, wholesale grocers, or wholesale druggists," and the recently enacted H. R. 1370, contains a similar provision. Such a law is a public necessity in the rural districts.

The phrase "commonly used household drugs" in the act, however, is entirely too broad and inclusive, and opens the door to abuses by storekeepers in the selling of potent remedies, such as, for example Paregoric (Camphorated Tincture of Opium). It is not generally known that Paregoric is widely sold by storekeepers throughout the country. The Federal Narcotic Division of Philadelphia tell me that thousands of storekeepers, including those of Pennsylvania, are given "permits" by the Government, under the Federal Narcotic Law, to sell Paregoric.

The Pharmacy Law of New Jersey (Secs. 8, 9) permits the sale of simple non-poisonous domestic remedies by retail dealers in rural districts. The Pharmacy Law of New York State (Sec. 234), permits storekeepers to sell under certain conditions, medicines and poisons for a period not exceeding one year upon the payment of a fee of three dollars, and the Pharmacy Law of Ohio (Sec. 12707) specifies a number of drugs that may be sold by retail dealers.

The Pharmacy Law of Massachusetts (Sec. 35), however, is much more comprehensive and specific than these, as it does *not* apply to the sale by merchants at retail of the following drugs and chemicals used in the arts or as household remedies: "alum, ammonia, bicarbonate of soda, borax, camphor, castor oil, chlorinated lime, citric acid, copperas, cottonseed oil, cream of tartar, dyestuffs, epsom salt, flaxseed, flaxseed meal, gelatin, ginger, Glauber's salt, glycerin, gum arabic, gum tragacanth, hops, hyposulphite of sodium, licorice, lime water, linseed oil, litharge, magnesia, olive oil, peroxide of hydrogen, petrolatum, phosphate of sodium, rhubarb, Rochelle salt, sal ammoniac, saltpetre, senna, slippery elm bark, spices for seasoning, sugar of milk, sulphate of copper, sulphur, tartaric acid, turpentine, extract of witch hazel, and zinc oxide; nor to the sale in the original packages of the following, if put up by registered pharmacists, manufacturers or wholesale dealers in conformity with law:

flavoring essences or extracts, essence of Jamaica ginger, insecticides, rat exterminators, aromatic spirit of ammonia, spirit of camphor, sweet spirit of nitre, syrup of rhubarb, tincture of arnica and tincture of rhubarb; nor to the sale of the following poisons used in the arts, if properly labelled and recorded (as provided in the law): muriatic acid, oxalic acid, nitric acid, sulphuric acid, arsenic, cyanide of potassium, mercury, phosphorus and sulphate of zinc." (Pharmacy Law of Massachusetts, 1926, Section 35.)

I would recommend that our Committee on Legislation be requested to consider the expediency of having the Pharmacy Law of Pennsylvania amended along the lines of the Massachusetts Law. It is improbable that the Pennsylvania Legislature would consent at present to enact legislation to confine the sale of all commonly used household drugs to registered pharmacists, except in rural districts, as should be done, but an enlightened public opinion may demand this in time.

STATE PHARMACY LAW ON DRUG STORE EXPERIENCE

The Pennsylvania Pharmacy Law requires "three years' practical experience in a pharmacy under the personal supervision of a pharmacist" as a prerequisite for applicants for examination and registration as a pharmacist. The law was enacted in 1925 and is an amendment to the act of 1917, which required *four* years of practical experience, and which followed, in this respect, the original pharmacy law of 1887.

Forty years have passed since the original law was enacted and during this time many changes have taken place in the practice of pharmacy.

As previously pointed out, fifty years ago pharmaceutical manufacturing was still done, to a large degree, at least, in the drug store; since then there have been radical changes induced by economic conditions, and fifty years ago few of the colleges of pharmacy existing had laboratory work and attendance on this was not obligatory. Today there is no college of pharmacy in the land without obligatory laboratory work.

A revolution has taken place and the vital question arises:

> "Is the practical instruction given in the drug store today of such a character and extent as to justify its continuance as a prerequisite for the examination and registration of pharmacists?"

If it is not, then the original intent of the law cannot be complied with and the law should be changed to meet the changed conditions.

How shall the pharmacy law be amended? "That a college training in pharmacy cannot entirely replace drug store experience is, I believe, admitted by all except a group of professors who live in the clouds" (Arny). And the question, therefore is: *"How,* and *when* shall the pharmacy student of today get his practical experience? Shall it be *before* graduation or *after?"*

It seems to me that Professor H. V. Arny has solved the problem in a recent article in the *Druggists' Circular* (May, 1917) entitled "For an Interneship in Pharmacy," in which he urges practical experience *after* graduation. He advocates, in brief, "compulsory attendance at a college of pharmacy giving a three-year course and credit for the time spent in college in lieu of the drug store experience," and for "one year of compulsory drug store experience after graduation, analogous to the well-established custom of internesship in medical education."

He raises the question "Whether the time is not ripe for the creation of the Pharmaceutical Interne." He states that,

> "Sketchily outlined, the plan of pharmaceutical education would include (a) grammar school education; (b) graduation from a four-year high school course; (c) graduation, from a recognized three-year college course; (d) upon graduation, the graduate may take the qualifying board examination on the theoretical subjects taught in the college course and upon successful passage of the examination, he becomes legally designated as 'Interne in Pharmacy,' or some other suitable name; (e) after one year of proper experience as interne in a recognized pharmacy, the person comes up for the practical examination of the board upon the passage of which he becomes a registered pharmacist."

I recommend that our Committee on Legislation study the problem, and if deemed expedient, take steps in co-operation with the State Board of Pharmacy to have our state pharmacy law amended along the lines indicated, also that the requirement of "practical experience" in the laws be broadened. It makes no practical difference whether the practical experience be had in a retail, wholesale or manufacturing pharmaceutical establishment, or in a hospital, or in the Government service provided it be practical pharmaceutical experience of the right kind.

We cannot shut our eyes to the fact that commerce plays a vital part in the conduct of the modern drug store, and so long as it is kept within reasonable bounds, and does not tend to submerge the profession of pharmacy, its existence is justifiable, because it meets a public need and because it permits the existence of many drug stores which otherwise would have to go out of business. This latter might not be a bad thing in some cases, but the wide distribution of drug stores permits wider public service.

PHARMACEUTICAL COMMERCE, INCLUDING MERCHANDISING

It seems to me that the time is here when the colleges of pharmacy should teach, comprehensively and scientifically, *not* commercial pharmacy, because, strictly speaking, "there isn't any such animal," but *pharmaceutical commerce,* including merchandising in all its phases, which is a very different proposition. Some of our colleges are already doing splendid work in this direction, but it should be developed until graduates of colleges of pharmacy are master of the principles of commerce, with special application to the merchandising of drugs and legitimate side lines.

In fact, so urgent is the need of such training, that I believe the time is coming when colleges of pharmacy must establish departments of pharmaceutical commerce, both for graduate and post-graduate instruction.

Pharmacists of Pennsylvania! Hold fast to professional service in the practice of pharmacy. Do not be swept off your feet by modern commercialism. The dollar is not everything. While it may sound old-fashioned, there is something more in pharmacy than the buying and selling of goods—it is the scientific service that the skilled pharmacist can render the sick. Eliminate this from the drug store and you have nothing but a near-department store, and a poor one at that.

THE OLD LANDMARKS

And while the modern economic conditions incident to the enormous development of manufacturing pharmacy, the increasing severity of legal standards for the identity, purity, quality and strength of drugs, and particularly the difficulties attending the legal use of alcohol for manufacturing purposes, make it impossible, practically, for the average retail pharmacist to manufacture his own preparations, as of old, yet there are "other worlds to conquer" if he but sets out to conquer them.

Pharmacy has a history of which we may well be proud. I know of no more fascinating book than that written by our fellow mem-

ber Professor Charles H. LaWall on "4000 Years of Pharmacy." It is not the conventional dry-as-dust history. It is a story of the curious lore of the drugs and medicines of the ages and their applications for the relief of disease; and it is most inspiring.

There are many ways in which the profession of pharmacy can be made more useful, especially as a co-operative in the field of medicine. Thus Professor LaWall writes:

> "Prescription writing has not yet become a lost art and the pharmacist who fulfils his professional duties conscientiously must keep abreast of the scientific progress of the times in an active and intelligent manner.
>
> "The employment by the physician of diagnostic tests and analytical data obtained from the analyses of body fluids and excretions are making changes in the practice of medicine. Many pharmacists are equipping themselves to serve in this new and important field of work, especially in communities remote from hospital laboratory service. The up-to-date scientific pharmacist will find his services welcome in every community, will become an indispensable factor in public health work and will attain a position of honor and dignity directly commensurate with his professional knowledge and ability."

PUBLIC HEALTH SERVICE

There is no field of endeavor in which the pharmacist should be more interested than in the promotion of public health. It is not only his moral duty to promote such service, but its promotion would bring him more professional prestige. As Dr. Wilbur Krusen (May 27, 1927), writes:

> "Conspicuous among the duties of the pharmacist is the group which deals with public health. These activities constitute his major function in connection with social and community life. Filling prescriptions correctly is, of course, important to the public, as is also the display and sale of reliable products; but in the service to public health the pharmacist serves the community in a unique way. Naturally, there are many sources from which the public may secure accurate health information—the public schools, the newspapers, and the publications of Federal, State and private agencies. These all contribute their part to the solution of health problems; but the information they provide is general and must be made specific in order to meet the personal needs of the one who is confronted with specific troubles of his own. To give this personal assistance the doctor is at hand. But many people are afraid of physicians and hospitals. Moreover, the physician keeps office hours which are relatively

inconvenient for people who are busy with their own affairs. In addition to this, charges for consultation and treatment, even though modest, often keep the public from seeking the advice of a physician.

"The pharmacists are therefore more strategically situated than any other group of individuals to give personal advice upon matters of public health on which they are informed. The information is given free of charge and can be secured within easy walking distance of the home. The materials necessary for controlling the health problem are in stock and can be obtained promptly. Queries about health facts are casually asked by interested customers. Odds and ends of information not easily accessible in the health literature can be gained in such conversations with a pharmacist. A well-informed pharmacist is the best single individual to disseminate information about public health."

I would suggest that every retail pharmacist have in his store a case or cases for keeping hygienic and sanitary supplies of *all* kinds under strictly sanitary conditions. Such supplies embrace a long list of articles that are used daily in every household—such as soaps, tooth brushes, mouth washes, toilet requisites, disinfectants, etc., and to put this suggestion on a bald financial basis, the sale of such merchandise, if properly developed, would yield large financial returns and furnish a most profitable supplement to the drug end of the business. Drugs, as you know, are used intermittently, as illness requires; hygienic and sanitary supplies are used every day. While the margin of profit on such goods is not as great as on drugs, the larger volume makes for larger profits.

The intelligent sale of such products calls for professional, scientific knowledge, and the pharmacist, in order to develop this field properly, should become an expert in biochemical subjects by study and research. Get the government, state and local reports of health departments, study them thoroughly, and co-operate in every way with health departments in the splendid work they are doing for promoting the public health. *When the public comes to know that it pays to keep well, it will pay well to keep well, and it will gladly pay the pharmacist for skilled service in selling hygienic and sanitary supplies.* Furthermore, by reason of the confidence thereby established in him, the pharmacist should, on learning of diseased conditions in the families of his customers, promptly urge them to consult their physicians for early treatment.

It is a trite but eternally true saying that "no stream can rise higher than its source," and if we want to promote and advance the practice of pharmacy, the place to begin is with the colleges of pharmacy and their students.

HELP YOUR COLLEGES OF PHARMACY AND YOU HELP YOURSELVES

As that able master of pharmacy, Fred B. Kilmer writes (*Druggists' Circular,* June, 1927):

> "The greatest need is for men! Our colleges of pharmacy are the products of the age. Their efforts are divided along lines that will fulfill the demands of the times. Modern energy is directed towards mass-production. The colleges of pharmacy must turn out graduates of pharmacy. The colleges of pharmacy are what the followers of the art of pharmacy will them to be. The faculties of the colleges are acknowledged leaders in pharmaceutical education, but they cannot lead without followers. Our colleges need the active co-operation and support of every individual engaged in the calling. Those most interested take little thought as to the methods, the requirements or the needs of colleges of pharmacy. The colleges must run themselves or be not run at all.
>
> "The colleges of pharmacy need the sympathy and support of every man engaged in the calling. Wipe out or weaken pharmaceutical education and the drug store passes to a low grade shop. Our colleges of pharmacy need new buildings, increase of equipment, endowments for professorships, research laboratories. There are no Carnegies or Rockefellers in pharmacy; financial support must come from the ranks of the pharmacists themselves.
>
> *"According to the measure of his prosperity, and actuated by a sincere concern in the welfare of his calling, every man engaged in pharmacy can and ought to give to the maintenance of pharmaceutical education.*
>
> "The making of a real pharmacist does not depend wholly upon the management or the faculty of the college. Pharmacists are not made in the laboratory or class room—their real making lies with the student body, the college organizations, the humanizing influence of everyday contact with their fellows during college life. More than all, the worth of pharmacy falls upon the student himself. *He must be a man!"*

The future of pharmacy rests, therefore, not only upon the pharmacists of the future—the students of today, but equally as much, or more, upon the pharmacists of the present and the degree of support or lack of support they give their colleges of pharmacy.

Support your colleges of pharmacy to the limit—"until it hurts," and the result will be better colleges of pharmacy, better students and better conditions in the every-day practice of pharmacy.

Your officers have co-operated with the National Association of Retail Druggists during the year and I recommend the continued affiliation of our association with the N. A. R. D. This organization is doing splendid work for retail pharmacists, especially in the betterment of trade conditions, and should have the unstinted support of every pharmaceutical organization of the country. The same measure of support is due, also, to the American Pharmaceutical Association, which has labored so valiantly for three-quarters of a century to protect and advance the interests of professional and scientific pharmacy.

COLLABORATORS FOR THE PENNSYLVANIA PHARMACIST

Last year President George F. Lee recommended that "a permanent Committee of Correspondents of the Pennsylvania pharmacists be formed to consist of the secretary of each local or county association in the State, and that as new local associations are formed, the secretary is to become, automatically, a member of this Committee."

The first number of Volume 1 of *The Pennsylvania Pharmacist* was issued in August, 1926, and it has not been practicable to put this recommendation into effect, as yet, but I would urge that it be done as soon as possible, either as a Committee of Correspondents, or as collaborators, the names to be given on the cover page of the journal. **We cannot have too many points of contact with our members and representatives in every section of the State would be well worthwhile.**

Many state pharmaceutical associations depend for the entertainment functions of the annual meetings upon their Traveling Men's Auxiliary, and it has been suggested that our association do likewise. I am not prepared to make a definite recommendation along this line. Our Committee on Entertainment has done splendid work, and this year particularly, in co-operation with our Traveling Men's Auxiliary; but I would recommend that the suggestion be referred by this meeting to the Executive Board with power to act. I feel that, in this way, the most satisfactory solution can be had.

HONORARY MEMBERS

I would recommend for life and honorary membership in our association charter members Wilbur Fisk Horn, of Carlisle; Joseph Lyon Lemberger, the other living charter member, is already a life and honorary member.

I would recommend for honorary membership Louis Emanuel, of Pittsburgh, who is in the forty-ninth year of membership in our association, and Wilbur Lincoln Scoville, of Detroit; Chairman of the

Committee on National Formulary and a national figure in American Pharmacy.

In conclusion, I wish to thank the officers of the association for their fine co-operation during the past year, especially the Executive Committee, and our Secretary, whose work for the association has been tireless and most efficient. I wish, also, to thank the members of the committees and the rank and file of the members of the association for their splendid support.

The past fifty years of the Pennsylvania Pharmaceutical Association has been glorious in service and achievement. In the words of the late John Wanamaker, "May those who follow us continue to build with the plumb of honor, with the level of truth, and with the square of integrity, courtesy, education, and mutuality."

FURTHER STUDY OF THE TANNIN OF HEUCHERA AMERICANA LINNÉ*

By Josiah C. and Bertha L. DeG. Peacock

THIS PAPER is intended to review, and will be found to revise in some particulars, the results of an investigation of the root of Heuchera Americana, published by one of us (J. C. P.) in AMERICAN JOURNAL OF PHARMACY, April, 1891.

Working then with the methods in general use for isolating and purifying tannins, as outlined in that paper, there was obtained a dark brown mass, which was but slowly and only partly soluble in cold water; and while readily soluble in hot water, a large proportion of the dissolved matter separated when the solution was allowed to cool.

The color of this educt and its solubility behaviors toward water taken into consideration with its reactions to gelatin and ferric salts marked it plainly as a phlobaphene. A specimen of a similar substance from the present work is here shown for the opportunity to contrast the result of 1927 with that of 1891.

Within two years after the publication of those results, Henry Trimble and Josiah C. Peacock adapted certain suggestions, which had been made by others in the literature of the tannins, into a de-

*Read before the June, 1927, Meeting of the Pennsylvania Pharmaceutical Association.

cidedly improved and simplified method of isolating and purifying certain of these principles.

The most noteworthy of these utilizations was that of acetic ether (ethyl acetate) for the removal of tannin from water solution into which it is repeatedly brought as a means to gradual separation from the less soluble plant constituents, especially from resins and cold water insoluble phlobaphenes.

Although such use of acetic ether had been proposed by Löwe in 1872, through lack of application, its several very practical advantages over the troublesome and often disappointing fractional precipitation with lead salts (which procedure was so thoroughly ingrained in plant chemistry methods) had not been recognized. The prime utility and function of the acetic ether is simply that of an immiscible liquid with selective solvent action, while its other particular advantage is its easy manageability in recovery of solvent to obtain the extracted matter.

Reports on the satisfactory use of this simplified method were made in the following joint contributions by Trimble and Peacock: "Canaigre Tannin," A. J. P., April, 1893; and "The Preparation of the Oak Tannins, etc.," Proc. A. Ph. A., 1893, page 110, and A. J. P., September, 1893; while other references to its successful use and practical value were made by Trimble in the second volume of his monograph "The Tannins" published in 1894. Also during the next few years, it was used by him and by his students on a considerable variety and number of tannin bearing materials as attested by the pages of the AMERICAN JOURNAL OF PHARMACY over that period.

To return now to the stated object of this paper, as the proximate source of phlobaphene is expected to be a cold water or plant-sap soluble tannin, ever since the aforementioned adoption of acetic ether it has been thought desirable to try the process on a commercial sample of this drug in order to acertain the presence of a tannin of that nature; especially since, at that time, observation of the freshly collected root while drying noted the likelihood of much of the phlobaphene of the air-dried drug being an alteration product which is formed as the moisture is gradually dissipated.

For the purpose of this work, a quantity of the identified drug was reduced to dust-like powder. In milling, there was a loss of approximately 8 per cent. of unground drug, which was discarded.

The powdered drug showed 10.55 per cent. of moisture and 11.11 per cent. of ash.

To examine the drug for cold water soluble tannin, one kilo. of the dust-like powder was macerated at room temperature with five times its weight of water, with frequent stirring during twenty-four hours. The mixture was then strained and the resulting fluid filtered to obtain a brilliantly clear cold water infusion.

This infusion was shaken with several successive portions of acetic ether, which removed tannin and some other substance that at this stage prevented the tannin, in recovery of solvent in vacuo, from drying out as a porous or puffed-up residue; instead a varnish-like formation was obtained.

By treating this residue with cold water, filtering with the aid of paper pulp to clear, shaking out with acetic ether and removal of this solvent by distillation under reduced pressure, the quality of the tannin through frequent repetition of this process was gradually improved until the degree of refinement exemplified by the sample submitted herewith was attained.

Next, this purified tannin was dissolved in cold water and the resulting solution shaken in succession with petroleum ether, chloroform, benzol and ether, in attempt to further purify the tannin, especially through removal of crystalline acids which are frequently associated with the tannins. But only a minute amount of such substance was removed by any or by all of these solvents. From aqueous solutions this tannin is not removed in any considerable quantity by ether.

After these treatments the tannin was again taken from the water solution by means of acetic ether. The sample here shown was obtained by evaporating the acetic ether from such solution, after exhaustion of air from the flask, and thereafter dissolving the then similar residue in a small amount of acetone and repeating the distillation in vacuo, as a means of expelling an acetuous odor which clings to tannin that is dried out of acetic ether.

The outcome of this experiment clearly shows that the root of Heuchera Americana yields to cold water a tannin that is distinctly different in appearance and solubility from the phlobaphene material which was reported in 1891, and which was the best that the then used methods would afford.

The specimen from the present work conforms to the description given in sensible properties by the U. S. P. X. for gallotannic acid, from which tannin, however, it differs in certain physical and chemical effects as hereinafter mentioned. If this specimen of it is

contaminated at all with crystalline or other substance the amount of such is extremely minute.

Like the official gallotannic acid this tannin from Heuchera Americana is readily soluble in cold water, hot water, glycerin, acetic acid, alcohol, acetone and acetic ether. It is insoluble in chloroform, benzol or petroleum ether. It is dissolved by both ammonium and potassium hydroxides.

Its aqueous solutions are acid to litmus. They are promptly reddened and made turbid by addition of hydrochloric acid through production of phlobaphene, but are not so affected by oxalic, tartaric or gallic acids, nor by acetic acid in which, even in weak dilutions, all phlobaphene formations encountered in this work were soluble, the resulting solutions withstanding addition of water without precipitation.

Its aqueous solution gives flesh-colored precipitates with gelatin, dark-blue colors and precipitates with ferric chloride solution, and whitish flocculent precipitates with lead acetate. An excess of the ferric reagent, or a solution of it that contains uncombined hydrochloric acid produces greenish colors and precipitates.

This tannin decomposes barium carbonate with production of a soluble salt of that base.

Such are some of its properties in common with gallotannic acid. But this tannin from Heuchera Americana gives a precipitate with bromine water; it also gives a whitish precipitate with calcium hydroxide which upon addition of more of the reagent becomes bluish or slate-colored and finally assumes a reddish-brown or rusty color. Again, unlike gallotannic acid, it dissolves readily and freely in isopropyl alcohol.

The ease and degree of its solubility in ether appear to depend upon its state of hydration, or it may be that the occurrence of solution depends largely upon the fact that the cold induced through the evaporation of the ether applied to it brings about the condensation of sufficient moisture to cause the tannin to dissolve. An exact explanation is difficult to reach, since this tannin upon application of temperature above 100° C. tends readily toward phlobaphene formation. On account of that, it is not feasible to dehydrate the tannin without experiencing some change to phlobaphene; but, when thus dried, the tannin was much less disposed to dissolve in ether.

While this tannin, in common with gallotannic acid, gives blue colors and precipitates with ferric salts, it differs under the effect of

mineral acids in yielding a red insoluble phlobaphene as shown by the following experiment: 5 grams of the tannin were dissolved in water, this solution shaken with ether to remove any contained crystalline principles (such as the acid derivatives of phenols which are frequently found associated with the tannins); the liquid was warmed to dissipate the last portion of ether, and then mixed with enough hydrochloric acid to represent 10 per cent. of HCl gas in the mixture; after which the liquid was heated on a boiling water bath until the brick-red phlobaphene that was gradually formed seemed to have reached a fixed amount. The filtered liquid even upon cooling had a wine-red color; upon shaking it with petroleum ether, chloroform and ether in succession, only a trifling amount of crystalline matter was extracted, which result would indicate the likelihood that this substance (which was revealed at several junctures in the work, but never in more than minutest trace) is not an hydrolysis product of the tannin but evidently a principle that exists in the dry drug. From any of its solvents, it appeared almost invariably as needles radially arranged or interlaced. Similar crystals will be mentioned with other phases of this work. The brick-red phlobaphene was soluble in acetic ether, acetone and alcohol.

When an aqueous solution of this tannin is saturated with sodium chloride, the tannin is thrown out as a flesh-colored precipitate, which remains undissolved in contact with acetic ether, but the jelly-like formation that obtains upon addition of the acetic ether, when drained to remove any superfluity of the last, is found to be almost entirely soluble in acetone, as elsewhere mentioned for other phlobaphene formations from this drug.

In 1891, it was customary to group with gallotannic acid those tannins which give blue colors and precipitates with ferric salts. And, on that basis, at that time, colorless crystalline extractive which was removed by ether, sp. gr. 0.725, and which in water solution gave a blue color with ferric salts was generally interpreted as gallic acid. As the result of following these impressions, it was stated in the paper then published that such ether extracted traces of gallic acid from the freshly gathered roots and a greater proportion from the dried root.

But, upon finding that the cold water soluble tannin of this drug is under certain circumstances soluble in such ether, it at once became desirable to review the formerly used method and the statement as regards the finding of gallic acid.

Later experience has taught that, in the presence of a tannin which gives a blue color with ferric salts, it is extremely difficult, if indeed possible, by the use of such ether alone, to determine with certainty the presence or absence of minute amounts of gallic acid, since agitation af aqueous solutions containing only tannin with immiscible solvents disposed to remove gallic acid may remove enough tannin through inclusion of some of the aqueous layer by the other solvent to give a blue color, and thereby mislead. And now, with the knowledge before us that the cold water soluble tannin of Heuchera Americana is capable of solution in ether, sp. gr. 0.725, it is clear why evidence of gallic acid was then found. But since other evidence hereinafter adduced shows far more plainly that gallic acid is not present in the drug, it is fully realized that its presence, as stated in 1891, was a wrongly drawn inference and one which we would now correct.

Moreover, the occurrence or production of phlobaphene with accompaniment of gallic acid has grown to be more and more improbable because correspondingly inconsistent with observed fact, as acquaintance with a greater variety of tannins has been acquired.

Again, in 1891 precipitation of tannin with gelatin and weighing of precipitate was the usual procedure for determining the amount of tannin. But soon thereafter the hide-powder method of assay was adopted as preferable for comparing tanning values.

As the hide-powder method, which frequently sheds light on the constituents of tannin-bearing materials, had not been applied in the previous work, it was turned to as another approach to the question of the presence of gallic acid, and toward the settling of this matter it proved to be particularly helpful.

For this purpose, infusions of ten per cent. of the dust-like powder were prepared with both cold and hot water. The cold infusion was made by repeated stirring during six hours. The hot extraction was had by boiling the powder with water for one hour. Both liquids were filtered. The hot one was allowed to cool; whereupon it deposited considerable sediment and was therefore clarified with the aid of paper pulp.

Both solutions were brilliant, wine-red (that prepared with hot water had the more color), had odor of the drug, were strongly astringent and showed a strongly acid reaction to litmus. Both possessed a pronounced disposition to froth when shaken.

Both solutions gave abundant flesh-colored precipitates with gelatin solution; blue and blue-black colors and precipitates with ferric

chloride; and heavy pale-buff precipitates with lead acetate. Hydrochloric acid slowly caused precipitation in both liquids. Acetic acid did not precipitate either of the solutions.

The cold water infusion showed 19 per cent. of dissolved solids: while the clarified hot water decoction was found to contain 20 per cent. From the cold water preparation, hide-powder removed solids which indicated 10.85 per cent. of tannin or tanning value; from the hot water solution 12.82 per cent. All four of these figures refer to the air-dried powder.

The detannating effect of the hide-powder was rapidly realized and was very striking. Upon contact with the hide, the wine-red liquids almost instantly lost their colors; after maceration for an hour, the fluids were practically water-white, were found to have given up their astringency and almost all of their taste, as well as approximately five-sixths of their original titratable acidity. Both the original and the hide-treated liquids, rapidly decolorized potassium permanganate solution, the former to several times the extent to which the latter did this.

When the fluids from this hide treatment were filtered entirely clear, they showed no precipitate with gelatin, but a slight precipitate with lead acetate solution, and only a very slight and extremely fleeting color reaction with ferric chloride, as follows: first, a mere flash of purple or violet, changing instantly to blue and passing with almost equal quickness into green or greenish-yellow. The blue color produced by ferric chloride and gallic acid is distinctly different from this behavior through being appreciably permanent.

The liquids thus detannated were again treated with hide-powder to ascertain whether all reaction to ferric chloride would be removed by further effect of this agent. Such second treatment made no difference in the behaviors toward gelatin, lead acetate or ferric chloride, thus necessitating the attribution of these behaviors to causes other than tannin, unless they are due to a trace of tannin that is held in solution by other constituents of the drug.

However, this result is especially interesting as evidence of the absence of gallic acid. In addition there will be other evidence which shows that gallic acid is not present in this drug.

Attempts to observe by dialysis the behavior of infusions of the root and of solutions of the purified cold water soluble tannin were vitiated through prompt formations of phlobaphene, presumably from effect of some disturber in the parchment that was used as septum;

but, in every instance, whether with infusion or solution of the tannin, the outer liquid promptly showed, with ferric chloride, the same or a similar reaction as that described under the experiment of detannating: namely a fleeting tinge of blue (here usually without precedence by purple or violet) that quickly passed into a greenish or into a yellowish tint, when the latter, being little more than what the color of reagent itself imparted.

To study further the nature and amount of the substance to which this ferric chloride reaction is due, and to learn more regarding the behavior of the tannin constituents toward solvents, as also to note the amounts of extractive removed, a kilo. of the dust-like powder was exhausted with the following solvents: chloroform, ether, acetic ether and acetone. These were used in the order given, the drug being freed of the adhering solvent before the next was applied.

Chloroform Extract: The chloroformic percolate was of a pinkish color, and upon evaporation left a blood-red residue amounting to 0.75 per cent. of the drug. When this extract was treated with petroleum ether of low boiling point one-half of its amount dissolved, and upon evaporation of this solvent, was found to consist largely of fatty semi-solid of dark amber color. This mass was entirely soluble in ether, and water removed from it a minute amount of colorless needle-shaped crystals, an aqueous solution of which did not precipitate gelatin but gave with ferric chloride the transient color reaction which has been described in mention of similar crystals obtained by other means.

The frothing of the fatty portion when shaken with water strongly suggested the presence of saponin.

The other half of the chloroformic extract was a dark reddish-brown residue of mixed substances, which were entirely soluble in benzol and alcohol, but insoluble in water; behaviors which indicate resinous matter.

Ether Extract: Applied after chloroform, ether U. S. P. removed but a trifle of extract, approximately 0.07 per cent., or one-tenth of that removed by chloroform. The percolate exhibited but little color until concentrated by distillation for recovery of solvent, when it showed a golden-yellow varnish-like residue. Petroleum ether dissolved about one-fifth of this residue, after which benzol removed

but a trifle; and water applied next took into solution the minute amount of tannin which had been extracted.

It is interesting to note that while U. S. P. ether extracts but a minute amount of tannin from the air-dried drug, the purified cold water soluble tannin will dissolve in that ether, as already mentioned.

Acetic Ether Extract: Following chloroform and ether, acetic ether of 99 per cent. strength was applied. The percolate was of light amber tint and yielded but 0.26 per cent. of a flesh-colored powdery, scaly or granular residue upon recovery of solvent. Toward water this substance behaved like phlobaphene, being but slightly soluble and imparting but a tinge of color to the liquid, but which gave reactions for tannin with ferric chloride and gelatin. This extractive was not soluble in benzol, but dissolved readily in acetone or alcohol.

Now, strangely enough, the purified cold water soluble tannin is instantly and freely soluble in acetic ether, as though again, as in the case of ether, pointing to hydration as a likely essential to solubility.

Acetone Extract: After extracting the drug with the three mentioned solvents, acetone U. S. P. was applied. From the start of percolation, the solvent had a sherry-wine color, but this gradually decreased in intensity until the percolate was very pale amber. By this time but little solids were being removed, as learned by recovering of solvent from the successive lots of percolate. Up to this stage, acetone had extracted 7.17 per cent. of solids, which later proved to be almost entirely cold water soluble tannin.

But, at this juncture, with everything pointing to completion of practical exhaustion, the percolate suddenly regained its original color and in greater depth, and by continuing the process until exhaustion was again apparently accomplished, fully three times as much solids were removed. As extraction progressed, the solids so removed showed increasing tendency toward phlobaphene nature.

From the extractive which followed this change in the action of acetone, petroleum ether removed a minute amount of substance that formed colorless needles, which were soluble in water and gave the transient bluish and greenish colors to which reference has been made.

The extractive obtained by means of acetone before this unusual occurrence was of a slightly reddish color, porous, and had the appearance of a mass of yellowish-white tannin with some admixture of reddish phlobaphene; and this it proved to be upon treatment with

water which dissolved it with the exception of 0.40 per cent. of phlobaphene and resin.

After this strange occurrence, the continuance of percolation to exhaustion was a protracted process. It was carried on over several weeks, during the greater part of which period there was removed an apparently fixed quantity of dissolved solids per volume of solvent, which, though trifling in each portion of percolate, totalled a considerable amount, and seemed to imply some peculiar change in the drug with production of extractive that was but sparingly soluble in acetone, each lot of which was accordingly saturated—the most plausible explanation for the unending supply of what upon recovery of solvent appeared to be a mixture of porous phlobaphene and a varnish of other substance.

Percolation was eventually discontinued for the reason that only a minute amount of tannin which would dissolve in water was being extracted. But it should be noted that acetone was still removing matter which, treated with cold water and this solution filtered, continued to precipitate gelatin and react characteristically also with ferric chloride for tannin.

In order to confirm this peculiar behavior with acetone, another portion of the original drug powder was percolated with another lot of chemically pure acetone; the result was identical. As this behavior was suspected as due to a gradual accumulation of water from this solvent with an ultimate disruption of the cells of the drug, or some similarly occurring change that favored extraction, another portion of the original drug powder was moistened with just sufficient water to make it damp to the touch, and then percolated with acetone. With this preliminary treatment made, acetone forthwith exhausted the drug to the limit of its solvent effect.

In the purification of the tannin extracted by means of acetone, a phase was reached wherein acetic ether perceptibly lessened or lost its ability to remove all of the tannin from water solution; the situation seems to indicate that there was a portion of the tannin (obviously most closely approximating the cold water soluble tannin) which was readily removable, while another portion (of more distinctly phlobaphene nature) was not readily given up to acetic ether by the water solution.

When such juncture was reached, the addition of sodium chloride to saturation instantly brought about phlobaphene formation and precipitated the phlobaphene, which remained undissolved in contact with acetic ether, but which dissolved almost completely in acetone,

and, upon recovery of same, showed as a porous residue with red-brown color that tended to deepen with each repetition of the process.

After prolonged extraction with acetone, the marc was freed of this solvent and then treated first with cold water and thereafter with boiling water. Both treatments removed tannin-reacting matter as shown by gelatin and ferric chloride. There was an abundance of starch in the hot water extract.

It is remarkable that while acetic ether readily dissolves every form of water soluble tannin so far obtained from Heuchera and most of the phlobaphene formations, still when it is applied directly to the drug it removes but little of either, as stated. And, again, while ether dissolves the purified cold water soluble tannin, it does not dissolve the phlobaphene forms which result therefrom, nor, as pointed out, does it extract any considerable amount of either form of tannin from the drug. But, as proved by actual trial with both acetic ether and ether, if the powdered drug is first moistened with water, as in a similar experiment mentioned for acetone, tannin is removed in far greater proportion—further confirmation of hydration as requisite to these solubilities.

As compared with these behaviors acetone eventually extracts and, subsequent to any purification or phlobaphene formation, dissolves all forms of tannin from Heuchera, which (as the specimens show) vary in color and physical form assumed from pale-buff or pinkish flesh-colored powder through porous masses (that possess the appearance of incinerated ferric oxide) to a condition of transparent gum-like formation which suggests kino or red (eucalyptus) gum.

The commercial ether, sp. gr. 0.750, used in 1891 to extract the drug for tannin was favored by the presence of the ten per cent. of alcohol which it contained, as all of the tannin and phlobaphene of Heuchera are soluble in alcohol.

As said in the beginning of this paper it was for the purpose of reviewing, in the light of improved methods, the inferences drawn in 1891, that this work was undertaken. From the evidence set forth herein, it is plain that the reaction on which the presence of gallic acid was then predicated was due to a trace of tannin or to an associated crystalline substance that is present in minute amount and which gives a fleeting bluish color reaction with ferric chloride instead of the more permanent color caused by gallic acid. Gallic acid is not present.

Phlobaphene production shows that the tannin of Heuchera Americana is not gallotannic acid.

The isolation from Heuchera of a cold water soluble tannin of its type, in the highly refined state which the accompanying specimen reflects, affords much encouragement for the separation and study of this class of plant principles, as a practical way through which to comprehend some of the changes which occur in the curing of astringent drugs, and as the means to a better understanding of the preparations which are made from them.

AN OBSERVATION UPON DIPHTHERIA IMMUNES

By David Wilbur Horn, Ph.D.

AN INFECTION of *B. diphtheriæ* was recently carried into three of the elementary schools of Haverford Township, Delaware County, Pa.[1] The writer made the microscopic examinations of the cultures from the throats of all the presumable contacts.[2] Upon upward of one hundred school children the findings show such a marked difference between those immunized with toxin-antitoxin and those not immunized, that it seems wise to make this apparent difference known. Subsequent observation in other instances later will undoubtedly determine whether or not the difference shown corresponded to a real difference in fact in the physiology of the children of the two groups.

All the cultures were made upon Loeffler's serum in the usual way. After nine to eleven hours' incubation at "blood heat," smears were made, and stained by Niesser's method.[3] As a rule the Health Officers sent cultures into the laboratory daily until negative findings were obtained; the average number of cultures per throat was about 2.3, but in some instances as many as nine cultures were made from one and the same throat.[4] In one school the children ranged in age

[1] The origin of the infection is obscure. There is one *coincidence* mentioned in this connection, namely, that in two separate schools the first cases known were boys who had recently visited a circus in Philadelphia, and the first case in the third school was a sister of one of the boys.

[2] The cultures in the first cases noticed were examined in the laboratory of the Bryn Mawr Hospital (during an absence of the writer from home).

[3] "The Polar Staining is beautifully demonstrated by Niesser's Method." Roger S. Morris, Clinical Laboratory Methods, p. 220.

[4] The infection was handled very promptly, and thus probably checked; but it must also be regarded as of low virulence. The records show that three or four children developed clinical diphtheria, two others showed symptoms leading their physicians to administer antitoxin, and the mother of one family was under treatment. A typical culture from one of the school children was examined and then tested out for virulence to guinea pig, in the laboratory of the Pennsylvania State Department of Health. It was reported positive but avirulent.

from five and a half to seven years, in another from seven to nine years, and in the third from eight to ten years. All who had been immunized had been treated with toxin-antitoxin within four years and none more recently than November, 1926. As a rule the Schick test had been applied to each child approximately six months after the toxin-antitoxin. No school children had been submitted to the Schick test who had not been given toxin-antitoxin and therefore it is not known how many of the untested already were immune.[5]

Group I—Immunized Contacts

Children immunized[6] and showing negative Schick test	34
Children giving one or more positive cultures within two weeks after exposure	16, or 47%
Children giving one or more atypical cultures within two weeks after exposure	1, or 3%

Group II—Non-Immunized Contacts

Children neither treated with toxin-antitoxin nor tested by Schick test[7]	74
Children giving one or more positive cultures within two weeks after exposure	9, or 12%
Children giving one or more atypical cultures with two weeks after exposure	12, or 16%

Conclusion

It seems unmistakable that cultures that were morphologically typical were obtained more frequently from those who had been given toxin-antitoxin and who showed negative Schick tests, than from those not thus immunized.

[5] All data in this paper not strictly relating to the writer's own laboratory work was derived from the public school physician Dr. I. B. Roberts, the public school nurse Mrs. Hunnewell, and the health officers J. F. Hartness and P. Z. McCurdy.

[6] Among the associates of these children, but not included in the summary, were two who showed *positive* Schick tests after treatment with toxin-antitoxin; one of these died.

[7] Among these children was one, who with his small brother of "pre-school" age, had had diphtheria in March, 1926. The throats of both showed atypical and positive cultures at first, but both cleared up promptly and yielded negative cultures.

THE HEINITSH DRUG STORE*

The Drug Store of the First President of the Pennsylvania Pharmaceutical Association

By Harold W. Hutchins

IN VIEW OF the fact that the Pennsylvania Pharmaceutical Association is holding its fiftieth annual meeting this June, and that the first president of the association was Charles H. Heinitsh, a one-time owner of the Heinitsh Drug Store of Lancaster, Pa., established in 1780, I thought it might be of interest to present some facts regarding this store and other data concerning other very old drug stores.

Through the courtesy of E. L. Page, of the Heinitsh Drug Store, and a member of the Pennsylvania Pharmaceutical Association, I obtained the following data which was recently published in the *Practical Druggist* (March, 1927):

> "The Heinitsh Drug Store boasts of the fact that it has been under the ownership of the Heinitsh family since 1780. That in itself is an enviable record in these days when drug stores are changing ownership overnight. How many others can equal or best this record of ownership in connection with their own stores?
>
> "Here is the history of the ownership since the store was established: 1780, Carl Heinrich Heinitsh; 1803, August Heinitsh; 1815, Heinitsh & Co.; 1816, A. & J. F. Heinitsh; 1818, J. F. Heinitsh; 1841, J. F. Heinitsh & Son; 1849, Charles A. Heinitsh; 1899, S. W. Heinitsh; 1911, A. A. Heinitsh.
>
> "A picture of the Heinitsh store taken in 1841 shows the unique display windows of the olden days, and close observation shows that the windows are not the stained glass like church windows, but behind each pane of glass can be seen a shop bottle with medicine in it. This is the same with the windows on the second and third floors.
>
> "Here again we see the evolution of 'Ye Olde Apothecary Shoppe' for these show bottles are now moved from the front of the drug store to the extreme rear, and in many instances relegated to the cellar.
>
> "In the store one may also see an old canister labeled 'Carl H. Heinitsh,' dated 1759 at Lutzen, Germany. This also attests to his character, efficiency, etc. Are there many stores with sheepskins dating back to 1759?

*Read before the June, 1927, Meeting of the Pennsylvania Pharmaceutical Association.

"There is also preserved the Bible belonging to the founder. It is all written by hand in the German language, having been done in 1761. On the first page is written the name of the founder of the Heinitsh Drug Store, Carl H. Heinitsh, born 1738. He came to America in 1760, and established a drug store at Lancaster, Pa., in 1780. Both this foregoing record and the Bible are in a wonderful state of preservation.

"The diary kept by the founder of the store is also well preserved and deals with personal items such as: 'I went to Philadelphia on June 25th, 1787, to buy fish-hooks.' It is also a chronicle of local events such as marriages, births, deaths, visits, etc., while the whole diary is given over at frequent places to essays on friendship such as this notation: 'Friendship is the wanderer's supporting staff, love is just the wanderer's cane, never will I reject friendship.' Among the many written tokens of esteem for their friendship with Carl H. Heinitsh is one signed by Charles Cist, the printer of the first pharmacopœia of the United States published at Lititz, Pennsylvania, and photographically reproduced in the 'First Century of the Philadelphia College of Pharmacy.' The title page of the book bears the imprint: 'Philadelphiæ: Ex-officina Styner and Cist. MDCCLXXVIII' and on the preface: 'Lititz, Mart. 12, 1778.'

"There are only two books existent of the first pharmacopœia. One of these is in the Heinitsh store, and the other is the possession of The Historical Society of Pennsylvania. J. W. England, editor of 'The First Century of the Philadelphia College of Pharmacy,' tells me that the former secretary of the American Philosophical Society of Philadelphia, the late Dr. I. Minn Hays, advised him that that society had a copy in its possession. Mr. Page, of the Heinitsh store, said that he has had many requests for their book from colleges of pharmacy and historical societies. Charles Cist did the printing at his home in Lititz, Pennsylvania.

"In the store one may also see an old canister labeled 'Flints' which were used in the old flint-lock muskets during the Revolution and later wars. Do many stores still stock these?

"On the day the interview for this article was granted, Mr. Page, who was most patient and courteous, said that he had filled a prescription that morning which dated back to 1861, and was a cough mixture. The young lady said that remedy had helped her grandfather so much during the Civil War and the family had always fallen back on it ever since.

"On the file that this particular prescription was recorded, were 6500 prescriptions dating from 1860 to 1865. Are there many remaining stores in this country that are having refills dating sixty-six years back, or even longer?

"The block that this store is in, and the whole town of Lancaster, has completely changed since the store was established in 1780, but the Heinitsh store remains the same except that it has been modernized to the last word in up-to-date drug stores, and now extends on back into the next block.

"On this street is a hardware store, said to be the oldest hardware store in the United States. They possess an old charge book showing that whiskey was sold in the hardware store in those days. One of the charge accounts is in the name of George Washington, but we will leave the detailed explanation of that to Rupert Hughes. Now, the hardware merchant who sells liquor, or rather who is caught selling liquor, is a criminal. How times have changed!

"I wonder if there are any stores with a more colorful or historic background than the Heinitsh Pharmacy of Lancaster, Pa., or a single store that has been in one family for a longer period of time? If there is, you will have a hard time convincing the inhabitants of Lancaster, Pennsylvania.

"The aforesaid town is one which contributes much of the tobacco grown in the United States, and is generally known as 'Lancaster County Cabbage.'"

According to the "First Century of the Philadelphia College of Pharmacy," Christopher Marshall was the founder of the famous Marshall drug store of Philadelphia, "established in 1729 at Front and Chestnut Streets. In 1735 he purchased a property on the south side of Chestnut Street west of Second (present number 214) where he continued his business. He was a remarkable man in his day and filled many positions of honor and trust. Christopher Marshall, Jr., and Charles Marshall, his sons, became his partners in 1765 and succeeded, in 1772, to the business, and later the latter became the active manager." In 1776, "Congress ordered Charles Marshall of the apothecary shop at the 'Golden Ball' to look after the sick and wounded of the Continental Army in the hospitals of Philadelphia." His daughter, Elizabeth Marshall—the first woman pharmacist of America—succeeded her father and continued the business until 1825, when it was sold to Charles Ellis and Isaac P. Morris, and in 1830 this firm was dissolved.

Through the kindness of Professor Otto Raubenheimer, the well-known historian of American pharmacy, I have received the following additional data on "Old Drug Stores in the United States":

1729 Christopher Marshall, Chestnut and Second Streets, Philadelphia, Pa.

*1748 Rau Pharmacy, Bethlehem, Pa. (Since 1752 in present location at 420 Main Street.)
1752 Pharmacy of the Pennsylvania Hospital, Philadelphia.
1762 Wetherill's Drug Store, 65 North Front Street, Philadelphia.
1771 Townsend Speakman, Market and Second Streets, Philadelphia.
*†1780 Heinitsh, Lancaster, Pa.
1780 Apothecaries Hall, Charleston, S. C. (Fixtures in Charleston Museum.)
1786 Philadelphia Pharmacy for the Poor.
*1791 W. L. Bond, Fredericksburg, Va. The oldest in Virginia.
*1792 Stabler-Leadbeater Pharmacy, Alexandria, Va.
*1795 Dr. Thomas O'Hara Croswell, Catskill, N. Y. (Owned by William D. Du Bois, an Honorary President, A. Ph. A.)
1796 Frederick Miller, apothecary shop to the "Golden Mortar," first pharmacy in Washington, D. C.
*1798 Hickman, 336 South Second Street, Philadelphia. (Now Hickman, Miller & Baer.)
*1799 Kemp's Pharmacy, Brooklyn. (Now 120 Court Street.)
1800 First pharmacy in Middletown, Conn. Thomas Lamb.
1800 John Biddle, Market Street between Fourth and Fifth Streets, Philadelphia.
1802 William Lehman, South Second Street, Philadelphia.
*1802 First pharmacy in Poughkeepsie, N. Y. (Existed until 1925 when it was sold owing to the death of Mr. Wood of the J. Wood Drug Co.)
1804 Dr. John Church, Bowery and Spring Street, New York City.
*1806 Dr. Henry Walter, 6 Bowery, New York City. (Now W. M. Cliffe.)
1806 Dr. J. Peck, Burlington, Vt.
*1808 Pharmacy, 28 Fulton Street, New York City.
1810 John P. Fischer, 106 Bowery, New York City.
1812 George Glentworth, Sassafras and Race Streets, Philadelphia. (Fixtures in Museum of Philadelphia College of Pharmacy and Science.)

*Still in existence.

†This pharmacy holds the unique distinction of being in the same family since its foundation.

There are doubtless other very old drug stores in the United States, established since 1729, the time the first Marshall drug store was founded in Philadelphia at the sign of the "Golden Ball."

(Should any reader of this article know of another store bearing an ancient history, the Editor will be pleased to have such information.)

OPPORTUNITIES FOR CHEMISTS IN THE UNITED STATES CIVIL SERVICE

THE UNITED STATES GOVERNMENT employs more chemists than any other organization in the world. The activities of the Government's chemists embrace practically every branch of endeavor to which chemistry is applied. In addition to a force of approximately 1,000 chemists, there are in the Government service a large number of workers whose duties involve chemistry in some degree, such as technologists, patent examiners, physicists, etc.

Other Government employees perform tasks incidental to chemical work. These are laboratory aids, scientific assistants, and other assistants. For this class there is excellent prospect of advancement to the higher grades, provided advantage is taken of the opportunity for study and research afforded. There are many instances where persons who entered the service in minor capacities have advanced to positions of responsibility with good salaries.

Five grades of chemists.—Civil-service examinations for chemists are ordinarily of five grades, namely, junior chemist, assistant chemist, associate chemist, chemist, and senior chemist. The annual salaries prescribed for these positions in the departmental service at Washington D. C., as allocated under the classification act of 1923, are $1,860 to $2,400 for junior chemists; $2,400 to $3,000 for assistant chemists, $3,000 to $3,600 for associate chemists; $3,800 to $5,000 for chemists; and $5,200 to $6,000 for senior chemists. The higher executive positions in chemical and other technical and scientific bureaus may be filled by promotion from the senior grade. While the classification act of 1923 is not applicable to positions in the field service, that is, those outside Washington, D. C., practically all Government departments, in so far as possible, have administratively allocated field positions so that the salaries of the latter correspond relatively to those of positions in the departmental service.

Junior chemist requirements.—Applicants for the position of junior chemist are required to report for a written examination. Examinations are held frequently throughout the country in practically every city of considerable size. Applicants are examined and rated on the subjects of general chemistry, elementary physics, and on an optional subject—advanced inorganic, analytical, organic or physical chemistry. A rating is also given on the applicant's education, training, and experience.

College degree necessary.—For admission to the junior chemist examination, applicants must show that they have been graduated with a bachelor's degree from a college or university of recognized standing, such degree requiring the completion of a course consisting of at least 118 semester credit hours, 30 credit hours of which must have been in chemistry. Applications will be accepted from senior students in such a course upon the condition that proof of actual graduation be furnished subsequently.

Requirements for higher grades.—Applicants for the positions of assistant chemist, associate chemist, chemist, and senior chemist are not required to report for a written examination, but are rated on their education, training, and experience, and upon writings on chemical subjects. The requirements for these positions are proportionately higher, in accordance with the responsibility and difficulty of the work involved, than those for junior chemist positions. A chemist entering the Government service in the junior grade may be successively promoted through the several grades as demonstrated merit warrants and as opportunity offers. It is possible for those who enter as junior chemists, therefore, to advance in time to positions in the Government service paying $6,000 or more a year.

Frequency of examinations—Filing applications.—Applications for examination in any of the several grades of chemical positions cannot be accepted until after an examination has been announced.—An examination for the position of junior chemist is usually held annually in April or May. Because of the need for eligibles, two or three other examinations for the junior grade ordinarily are held during the year. Examinations for the higher grades are held from time to time as the needs of the service require. For original appointment the demand is always much greater for junior chemists than

for the higher grades, due principally to the fact that, wherever possible, vacancies in the higher grades are filled through promotion. Copies of examination announcements are sent not only to the Civil Service Commission's general representatives at colleges and universities, but also to the heads of chemistry departments at the educational institutions, and may also be consulted in the post office or custom house in any city. Persons who desire to be notified of the announcement of an examination for chemists of any grade or in any specialty, may place their names on file for the purpose with the United States Civil Service Commission, Washington, D. C.

Duties of junior chemists.—The duties of junior chemists are the minor or routine operations of various phases of chemical work. The work of the Government chemical bureaus covers a wide and interesting field, embracing all branches of chemistry, chemical engineering, and industrial technology. In connection with the work of standardization, regulation, and investigative research, many problems arise which offer excellent opportunity for the acquisition of valuable experience. In many cases, young chemists in the Government service have the great advantage of assisting in research with scientists of unexcelled training and experience.

Scientific research encouraged.—An important feature of work in Government laboratories, which should be of particular interest to chemists, is the opportunity offered the individual to develop research problems. These problems do not always necessarily have a direct application to immediate practical work but may be of an entirely abstract nature. One instance of this is found in the study of rare gases by the scientists of the Bureau of Mines, which led to practical application of the highest importance in the production of helium gas for aviation and scientific purposes. The development of methods of determining the hydrogen ion offers another striking illustration. The results, which were published in a book entitled "The Determination of the Hydrogen Ion," have attracted favorable comment in many countries and have been of great value not only to the Department of Agriculture, where the study was carried on, but throughout the field of scientific research. Numerous other instances of the kind could be cited. The Government offers its chemists constructive, interesting work with unlimited possibility of development in their chosen profession.

Department of Agriculture performs varied duties.—The Department of Agriculture, which in its various bureaus employs more chemists than any other Government establishment, illustrates the great variety of Federal chemical operations. The work of the Bureau of Chemistry, which is chiefly concerned with analytical work and investigation under the food and drugs act, questions of agricultural chemistry of public interest, and other chemical investigations, ranges widely from the search for an improved analytical method to the synthesis of a newly discovered compound; from the determination of accurate physical constituents to the preparation of a new dye stuff, or a process for making syrup, or process of extraction of alkaloids from plant drugs. The agricultural research work of this bureau includes such diverse fields as the chemistry of carbohydrates; the composition of proteins, and the determination of their relation to nutrition; chemistry of leather and paper; crop chemistry; active constituents of plants; odorous constituents of fruits; chemistry of fruit acids; citrus fruit investigations; and engineering chemical work such as dust-explosion study.

Among the other bureaus of the Department of Agriculture in which a considerable number of chemists are employed are the Bureau of Animal Industry, the Fixed Nitrogen Research Laboratory, the Bureau of Dairying, the Bureau of Soils, the Bureau of Home Economics, the Bureau of Plant Industry, the Bureau of Public Roads, and the Forest Service. The names of these bureaus are sufficiently descriptive to indicate in a general way the nature of the chemical work performed.

Bureau of Standards employs many chemists.—The Bureau of Standards of the Department of Commerce is another Federal agency which employs a large number of chemists. These are chiefly concerned with testing and standardization. The work covers a wide field and includes the preparation, analysis, and certification of the composition of technical materials for use in checking the accuracy of scientific and industrial chemical analyses and for testing physical measuring instruments; development of standards of quality and methods of measurement; tests of materials, such as varnish, soap, ink, textiles, paper, leather, rubber, and chemicals; development of color standards and methods of color measurement with reference to their use in industrial color standardization; the specification of colorants and the products of which color is a pertinent property.

Laboratory facilities excellent.—Laboratory facilities of the various Government bureaus, particularly in Washington, are equal to the best found in the universities, and in many cases, for certain special research work, excel those of the universities and of private industries. Exceptional library facilities also are available. The departments are well equipped in this respect, and the Library of Congress and many scientific collections are open to Government employees. Because of the close contact of Government chemical work with the industries, experience obtained in the Federal service is ideal training for industrial research.

Association with scientists.—In and out of the laboratory young chemists come in contact with men of national, and even international, reputation, whose interests cover practically the entire field of chemistry. Meetings of scientific associations offer opportunity to hear scientific questions discussed by recognized authorities from all over the world.

Opportunity for postgraduate study.—One of the most attractive features of employment in Washington, from the viewpoint of the ambitious junior chemist, is the opportunity afforded to pursue postgraduate college work in evening classes. The schedules of many of the educational institutions in Washington are so arranged that day classes are duplicated at hours which do not conflict with the working hours of Government employees. Courses leading to masters' and doctors' degrees are available.

Departmental educational courses.—In addition to courses in the universities, both the Bureau of Standards and the Department of Agriculture give a number of valuable courses in technical and professional lines which also are arranged at hours convenient for Government employees. Postgraduate work in these departmental courses is accepted by a number of standard universities as credit toward higher degrees.

Field service attractive.—Opportunities for Government chemists to pursue postgraduate college work are not limited to those employed in Washington. The Forest Products Laboratory at Madison, Wis., for example, at which all chemical activities of the United States Forest Service are carried on, is maintained in cooperation with

the University of Wisconsin. Chemists employed at this laboratory have the benefit of contact with chemists of the faculty of the university and also have the use of the excellent university library. Under certain conditions, it is possible for chemists employed in the Forest Products Laboratory to take postgraduate work at the university and to receive university credit for a part of their research work done in the Government laboratory.

Bureau of Mines offers advantages.—Excellent opportunities for postgraduate work and for the acquisition of valuable experience are also available to chemists employed at the Bureau of Mines station at Pittsburgh, Pa. Pittsburgh being an industrial center, Government scientists employed in that city have the benefit of association with men of high standing in industrial technology. As a result of this contact, many of the Government workers secure lucrative positions in the industries. Those who desire to study for advanced degrees may do so at the University of Pittsburgh or at the Carnegie Institute of Technology. Research work at the Government station is accepted by the universities as fulfilling research requirements for advanced degrees.

A particularly attractive feature of scientific work at the Bureau of Mines station at Pitsburgh is the cooperative arrangement existing between the Bureau of Mines and the British Fuel Research Board. Investigators are exchanged each year by the bureau and the board. The American investigator selected has opportunity to study in English universities. For example, the present incumbent will reside for a year at the University of Sheffield, where he will conduct research and give lectures on the constitution of coal. Another attractive feature of the service at Pittsburgh is the bimonthly seminar which is held for the purpose of keeping alive a general interest in purely theoretical matters and of broadening the viewpoint of the younger members of the organization.

Government experience valuable.—As a result of experience gained in the Federal service and contact with eminent scientists and prominent manufacturers of chemical products, many chemists have found a Government position the stepping stone to a more highly remunerative one outside. Others who have remained in the service have been rewarded with steady advancement. In some cases chemists in the Government service have received appointments as instruc-

tors or professors in colleges and universities. Others have gone into private industry at increased compensation. It is generally recognized that the Government scientific and technical service is an excellent postgraduate training ground, and outside interests are ever on the alert to secure successful Government research workers.

Instances of advancement.—After eight years' work, a Government chemist only 32 years old obtained a position with a salary of $8,400 a year with a leading manufacturer of a material upon which he had worked. Within six years after entering the Government service two young chemists rose to responsible positions paying $3,800 a year. A considerable number of chemists have obtained positions in private industry with salaries in some cases as high as $8,000 or $10,000 a year. Two Government chemists secured positions as technical directors of large phosphoric acid plants. A number of others have gone into consulting work, their present yearly earnings being several times greater than those of the positions they held in the Federal service.

The instances cited here are but a few of hundreds in which young chemists have advanced to responsible positions in the Government service or have obtained excellent positions in private employ because of the experience and personal contact gained in Government work.

Chemists constantly needed.—In a force so large as the Federal civil service vacancies are constantly occurring. There is seldom a time when there are no openings for chemists, especially for junior chemists. The opportunity for employment for young college men and women in this field is excellent.

Other advantages of Government service.—Less important advantages of Government work are the 30 days' annual leave, 30 days' sick leave in meritorious cases, retirement with annuity, and benefits under employees' compensation acts in case of injury incurred in the performance of duty. It may further be said that Government employment offers a better prospect of steady work than does private employment generally. Chemists who are required to travel away from their official headquarters in the pursuit of their work are allowed actual transportation expenses and also are provided either with subsistence or an allowance therefor, depending on local conditions.

Not the least of the advantages of Government work is the opportunity it affords for useful public service. The contribution of the various Government chemical activities to the public health and general welfare, as found in the protective and progressive phases of the work, is immeasurable.

Opportunity for transfer.—After a chemist has served for a period of at least six months and has received absolute appointment he is eligible for transfer, under certain conditions in the interests of good administration, to a Government establishment other than that in which he is employed. When vacancies occur in the higher grades in one bureau they may be filled, therefore, by transfer of employees from other bureaus.

Where chemists are employed.—In addition to the Government establishments which have already been mentioned, there are many others which employ chemists. A table showing the approximate number, salary ranges, and specialties of chemists in the various Government bureaus follows. In consulting this table it should be borne in mind that in addition to those listed there are hundreds of employees in the Government service whose work involves chemistry in some degree. This table was compiled merely for the purpose of affording a comprehensive view of the distribution of chemists in the Government service and is not intended to be exhaustive.

Chemists employed in the United States Government Service

(This table is not intended to be exhaustive but was compiled merely for the purpose of affording a view of the distribution of chemists in the various Government bureaus)

[Specialties: A = Analytical; E = Executive; I = Inorganic; O = Organic; P = Physical]

DEPARTMENT OF AGRICULTURE

BUREAU OF CHEMISTRY

Number of Chemists	Salary Range	Specialty	Place of Employment
1	$6,000–$7,500	O	Washington, D. C.
13	5,200– 6,000	O	Do.
1	5,200– 6,000	O	Field.
12	3,800– 5,200	A	Do.
2	3,800– 5,200	A	Washington, D. C.

BUREAU OF CHEMISTRY (continued)

Number of Chemists	Salary Range	Specialty	Place of Employment
1	3,800– 5,200	O	Field.
12	3,800– 5,200	P	Washington, D. C.
1	3,800– 5,200	P	Do.
20	3,000– 3,600	A	Field.
7	3,000– 3,600	A	Washington, D. C.
18	3,000– 3,600	O	Do.
4	3,000– 3,600	P	Do.
31	2,400– 3,000	A	Field.
17	2,400– 3,000	A	Washington, D. C.
8	2,400– 3,000	O	Do.
2	2,400– 3,000	P	Do.
23	1,860– 2,400	A	Field.
19	1,860– 2,400	A	Washington, D. C.
4	1,860– 2,400	O	Do.
2	1,860– 2,400	P	Do.

BUREAU OF SOILS

1	$6,000–$7,500	E	Washington, D. C.
3	3,800– 5,000	IP	Do.
1	3,800– 5,000	IAP	Do.
1	3,000– 3,600	P	Do.
1	3,000– 3,600	IO	Do.
3	3,000– 3,600	IP	Do.
3	3,000– 3,600	IAP	Do.
3	2,400– 3,000	A	Do.
2	2,400– 3,000	P	Do.
2	2,400– 3,000	IP	Do.
7	2,400– 3,000	IAP	Do.
1	1,860– 2,400	A	Do.

BUREAU OF PUBLIC ROADS

1	$3,800–$5,000	E	Washington, D. C.
1	3,000– 3,600	I	Do.
1	2,400– 3,000	O	Do.
1	1,860– 2,400	O	Do.

BUREAU OF HOME ECONOMICS

1	$6,000–$7,500	E	Washington, D. C.
3	3,800– 5,000	O	Do.
1	3,000– 3,600	A	Do.
1	2,400– 3,000	A	Do.
1	2,400– 3,000	O	Do.
2	1,860– 2,400	O	Do.

FOREST SERVICE

Number of Chemists	Salary Range	Specialty	Place of Employment
1	$5,200–$6,000	E	Field.
1	3,800– 5,000	E	Do.
5	3,800– 5,000	O	Do.
1	3,800– 5,000	P	Do.
1	3,300– 3,900	E	Do.
5	3,000– 3,600	O	Do.
2	3,000– 3,600	P	Do.
4	2,400– 3,000	O	Do.
1	2,400– 3,000	P	Do.
5	1,860– 2,400	O	Do.
1	1,860– 2,400	P	Do.

BUREAU OF PLANT INDUSTRY

1	$5,200–$6,000	O	Washington, D. C.
4	3,800– 5,000	O	Do.
6	3,000– 3,600	O	Do.
8	2,400– 3,000	O	Do.
1	1,860– 2,400	O	Do.

BUREAU OF DAIRYING

1	$3,800–$5,000	O	Washington, D. C.
2	3,000– 3,600	O	Do.
6	2,400– 3,000	O	Do.
1	2,400– 3,000	O	Field.
1	1,860– 2,400	O	Washington, D. C.

BUREAU OF ANIMAL INDUSTRY

1	$5,200–$6,000	E	Washington, D. C.
2	3,800– 5,000	E	Do.
3	3,800– 5,000	O	Do.
4	3,000– 3,600	A	Do.
2	3,000– 3,600	O	Do.
6	3,000– 3,600	E	Field.
3	2,400– 3,000	A	Washington, D. C.
4	2,400– 3,000	A	Field.
3	1,860– 2,400	A	Washington, D. C.
1	1,860– 2,400	A	Field.

FIXED NITROGEN RESEARCH LABORATORY

1	$6,000–$7,500	E	Washington, D. C.
1	5,200– 6,000	E	Do.
1	5,200– 6,000	P	Do.
1	3,800– 5,000	O	Do.

FIXED NITROGEN RESEARCH LABORATORY (continued)

Number of Chemists	Salary Range	Specialty	Place of Employment
1	3,800– 5,000	P	Do.
7	3,000– 3,600	P	Do.
1	3,000– 3,600	I	Do.
1	3,000– 3,600	O	Do.
3	2,400– 3,000	P	Do.
2	2,400– 3,000	A	Do.
5	2,400– 3,000	I	Do.
1	2,400– 3,000	O	Do.
4	1,860– 2,400	I	Do.
2	1,860– 2,400	P	Do.
3	1,860– 2,400	A	Do.

CIVIL SERVICE COMMISSION

1	$3,000–$3,600	OP	Washington, D. C.
1	2,400– 3,000	IA	Do.

DEPARTMENT OF COMMERCE

LIGHTHOUSE SERVICE

1	$2,700–$3,000	A	Field.
1	2,400– 3,000	A	Do.

BUREAU OF STANDARDS

3	$5,200–$6,000	E	Washington, D. C.
1	5,200– 6,000	O	Do.
3	5,200– 6,000	P	Do.
4	3,800– 5,000	I	Do.
2	3,800– 5,000	A	Do.
4	3,800– 5,000	O	Do.
7	3,800– 5,000	P	Do.
3	3,000– 3,600	I	Do.
7	3,000– 3,600	A	Do.
1	3,000– 3,600	A	Field.
6	3,000– 3,600	O	Washington, D. C.
10	3,000– 3,600	P	Do.
3	2,400– 3,000	I	Do.
12	2,400– 3,000	A	Do.
3	2,400– 3,000	O	Do.
7	2,400– 3,000	P	Do.
9	1,860– 2,400	I	Do.
8	1,860– 2,400	A	Do.
1	1,860– 2,400	A	Field.
2	1,860– 2,400	O	Washington, D. C.
9	1,860– 2,400	P	Do.

BUREAU OF MINES

Number of Chemists	Salary Range	Specialty	Place of Employment
1	$5,200–$6,000	E	Washington, D. C.
1	5,200– 6,000	E	Field.
2	3,800– 5,000	E	Washington, D. C.
2	3,800– 5,000	O	Field.
4	3,800– 5,000	P	Do.
3	3,000– 3,600	O	Washington, D. C.
6	3,000– 3,600	A	Field.
2	3,000– 3,600	O	Do.
5	3,000– 3,600	P	Do.
1	2,400– 3,000	O	Washington, D. C.
9	2,400– 3,000	A	Field.
6	2,400– 3,000	O	Do.
2	2,400– 3,000	P	Do.
1	1,860– 2,400	O	Washington, D. C.
16	1,860– 2,400	A	Field.
3	1,860– 2,400	O	Do.
1	1,860– 2,400	P	Do.

GOVERNMENT PRINTING OFFICE

1	$3,800–$5,000	IAOP	Washington, D. C.
1	3,000– 3,600	IAOP	Do.
2	1,860– 2,400	IAOP	Do.

INTERIOR DEPARTMENT

GEOLOGICAL SURVEY

1	$3,800–$5,000	A	Washington, D. C.
2	3,800– 5,000	O	Do.
1	3,800– 5,000	P	Do.
3	2,400– 3,000	A	Do.
3	2,400– 3,000	O	Do.
1	1,860– 2,400	O	Do.

NAVY DEPARTMENT

1	$3,800–$5,000	E	Washington, D. C.
1	3,960	E	Field.
1	3,130	I	Do.
1	3,000– 3,900	A	Do.
4	2,400– 2,850	A	Do.
3	2,000– 2,250	A	Do.
4	9.60– 12.48	E	Do.
1	9.60– 12.48	A	Washington, D. C.
5	9.60– 12.48	A	Field.
1	9.60– 12.48	IA	Do.

NAVY DEPARTMENT (continued)

Number of Chemists	Salary Range	Specialty	Place of Employment
1	9.60– 12.48	AP	Do.
1	9.60– 12.48	IAO	Washington, D. C.
2	9.60– 12.48	IAOP	Field.
1	9.12– 11.60	IAP	Do.
1	7.68– 9.12	I	Washington, D. C.
5	7.68– 9.12	A	Field.
1	7.68– 9.12	IA	Do.
4	7.68– 9.12	IAO	Do.
1	7.68– 9.12	IAOP	Do.
1	6.40– 7.20	I	Washington, D. C.
6	6.40– 7.20	A	Do.
7	6.40– 7.20	A	Field.
2	6.40– 7.20	IO	Do.
2	6.40– 7.20	IAO	Do.
2	6.40– 9.12	IAOP	Do.
1	5.44– 6.00	IO	Do.

TREASURY DEPARTMENT

MINT SERVICE

4	$3,300–$3,900	I	Field.
1	3,000– 3,600	I	Do.
2	2,700– 3,000	I	Do.
1	2,400– 3,000	I	Do.
1	2,400– 2,700	I	Do.

CUSTOMS SERVICE

1	$4,500	E	Field.
1	3,500	I	Do.
1	3,500	A	Do.
1	3,300	A	Do.
2	3,300	IAO	Do.
2	3,300	IAOP	Do.
4	$3,200– 3,500	IA	Do.
5	3,200– 4,000	O	Do.
1	2,800	IAO	Do.
1	2,700	IA	Do.
2	2,600	A	Do.
1	2,600	IAOP	Do.
1	2,500	IAOP	Do.
1	2,300	A	Do.
1	2,300	IAOP	Do.
1	2,200	IAOP	Do.
5	2,100– 2,500	IO	Do.
1	2,000	OP	Do.
1	1,800	IA	Do.

Number of Chemists	Salary Range	Specialty	Place of Employment
		PUBLIC HEALTH SERVICE	
1	$6,000	E	Washington, D. C.
1	4,200	O	Field.
1	3,800	O	Washington, D. C.
1	3,800	P	Do.
4	3,600	AOP	Do.
1	2,500	P	Field.
3	$1,860– 2,500	AO	Washington, D. C.
1	1,860	P	Field.
		INTERNAL REVENUE SERVICE	
1	$5,200–$6,000	AO	Washington, D. C.
3	3,800– 5,000	AO	Do.
2	3,000– 3,600	A	Do.
9	3,000– 3,600	A	Field.
7	2,400– 3,000	A	Washington, D. C.
8	2,400– 3,000	A	Field.
11	1,860– 2,400	A	Do.
		WAR DEPARTMENT	
		QUARTERMASTER CORPS	
4	$2,400–$3,000	IAO	Field.
		AIR SERVICE	
2	$2,400–$3,000	IAP	Field.
2	2,100– 2,700	IA	Do.
1	1,860– 2,400	AO	Do.
		MEDICAL DEPARTMENT AT LARGE	
1	$3,300–$3,900	A	Field.
1	2,100– 2,700	A	Do.
		ENGINEER DEPARTMENT AT LARGE	
1	$2,400–$3,000	IO	Washington, D. C.
1	2,100– 2,700	IO	Do.
		ORDNANCE DEPARTMENT AT LARGE	
1	$5,200–$6,000	E	Washington, D. C.
1	3,800– 5,000	E	Do.
1	3,800– 5,000	E	Field.
2	3,000– 3,600	E	Do.
2	3,000– 3,600	I	Do.
1	2,400– 3,000	E	Washington, D. C.

ORDNANCE DEPARTMENT AT LARGE (continued)

Number of Chemists	Salary Range	Specialty	Place of Employment
2	2,400– 3,000	E	Field.
3	2,400– 3,000	A	Do.
5	2,400– 3,000	O	Do.
2	2,400– 3,000	IAOP	Do.
2	1,860– 2,400	A	Do.
1	1,860– 2,400	P	Do.

CHEMICAL WARFARE SERVICE

1	$6,000–$7,500	E	Field.
3	5,200– 6,000	E	Do.
6	3,800– 5,000	E	Do.
1	3,800– 5,000	O	Do.
3	3,800– 5,000	P	Do.
1	3,000– 3,600	A	Do.
10	3,000– 3,600	O	Do.
1	3,000– 3,600	P	Do.
1	3,000– 3,600	IAOP	Do.
3	2,400– 3,000	A	Do.
11	2,400– 3,000	O	Do.
4	2,400– 3,000	P	Do.
2	2,400– 3,000	IO	Do.
1	2,400– 3,000	OP	Do.
4	1,860– 2,400	A	Do.
8	1,860– 2,400	O	Do.
4	1,860– 2,400	P	Do.

ABSTRACTED AND REPRINTED ARTICLES

THE DETERMINATION OF FREE MERCURY IN COMMERCIAL PRODUCTS*

By H. B. Dunnicliff, M. A., Sc. D., F. I. C., and Kishen Lal, M. Sc.

THE METHOD involves the conversion of free mercury into mercuric bromide by bromine water, and the determination of the mercuric bromide so formed in dilute alcoholic solution. The methods in use may be divided into two classes: volumetric and gravimetric.

*Reprinted from *The Analyst*.

(A) VOLUMETRIC METHODS.—(1) Mohr's method of direct titration against standard silver nitrate is impracticable.

(2) Volhard's method is useless, because mercuric nitrate also reacts with potassium thiocyanate.

(3) The method of Moritz Kohn (*Z. anorg. Chem.*, 1908, 59, 271):—Mercuric bromide is taken up in 50 per cent. alcohol, and the solution made up to 100 cc. Portions of 20 cc. are treated with alkaline hydrogen peroxide and allowed to stand overnight. The reduction to metallic mercury is complete by the next day, and the bromine is present in solution as sodium bromide. The mercury is filtered off, and the filtrate made up to 250 cc. with 50 per cent. alcohol. Twenty-five cc. of the filtrate are then acidified with nitric acid, treated with excess of standard silver nitrate, and 6 cc. of ferric alum (5 per cent. solution in dilute nitric acid) added as indicator. The excess of silver nitrate is titrated against standard potassium thiocyanate. The following results were thus obtained:

Mercury present (as $HgBr_2$)	Mercury found (as $HgBr_2$)	Error Per Cent.
1.8868	1.9044	0.92
1.7544	1.7624	0.46
2.5984	2.6064	0.31

The objection to this method is that the bromide water treatment might sometimes result in the formation of other bromine products which would yield sodium bromide during the alkaline hydrogen peroxide treatment. The results are not consistent and tend to be high.

(B) GRAVIMETRIC METHODS.—(1) The simple evaporation of the alcoholic solution of mercuric bromide gives low results, owing to the volatilization of some mercuric bromide.

(2) Precipitation of mercuric sulphide from an alcoholic solution of mercuric bromide by hydrogen sulphide.

Weighed quantities of mercuric bromide, dissolved in ethyl alcohol and acidified with a few drops of hydrobromic acid, are precipitated as mercuric sulphide by saturating the warm solution with washed hydrogen sulphide. The color of the precipitate changes from yellow to orange-brown and finally to black: The precipitate is filtered off in a Gooch crucible, washed several times with cold distilled water,

then with alcohol and with ether, and then extracted with pure carbon disulphide, as in Vortmann's method (Vortmann. *Uebungsbeispiele aus der quantitativen chemischen Analyse,* 1910, p. 13):—

The crucible is placed on a glass tripod in a beaker containing some carbon disulphide. The mouth of the beaker is closed by a bolthead flask containing cold water. When the beaker is warmed on a water bath, the vapor of carbon disulphide condenses on the bottom of the flask and drips continuously in a fine steam through the crucible. The precipitate is finally washed twice with alcohol, then with ether, dried at 100° C., and weighed as mercuric sulphide.

Results:—*Theory* 0.2001 grm. Found (*a*) 0.2006; (*b*) 0.2005; (*c*) 0.2003 grm.; mean 0.2005 grm.; error 0.02 per cent.

(3) *Precipitation of Silver Bromide from Alcoholic Solutions of Mercuric Bromide by Silver Nitrate.*—A weighed amount of mercuric bromide is dissolved in absolute alcohol in a clean beaker, acidified with about 5 cc. of dilute nitric acid and treated in the cold, with brisk stirring, with silver nitrate solution until precipitation is complete. Excess of silver nitrate is avoided. The beaker is then placed on a steam bath in the dark, and carefully heated with constant stirring until the precipitate is completely coagulated and the liquid becomes perfectly clear. A drop of silver nitrate is added to the supernatant liquid to see that the precipitation is complete. The whole is then allowed to stand till the next day. The precipitate is collected in a Gooch crucible, washed with water acidified with nitric acid until the filtrate gives no turbidity with dilute hydrochloric acid, then with alcohol, and finally with ether until the filtrate is free from nitric acid. The precipitate is then heated for an hour at 95° C., cooled and weighed as silver bromide. This method is reliable; results obtained have been 100.083 and 100.033 per cent. of the theoretical amount.

If excess of silver nitrate is used, results are liable to be high (*e.g.* 100.23 to 100.30 of the theoretical amount) owing to silver nitrate absorbed by the precipitate of silver bromide.

Results tend to be low (*e.g.* 99.70 per cent. of the theoretical amount) if the vessel is not allowed to stand overnight.

The sulphide method is preferred because the silver bromide value might be high, owing to the presence of other soluble bromides produced during the extraction of mercury with bromine water.

DETERMINATION OF MERCURY IN AN OINTMENT.—The ointment consisted of fat and free mercury. A portion of the ointment was treated with ether, and the mass gently shaken in order to dissolve fat and other soluble matter. The ethereal layer was filtered through a Gooch crucible under suction. The residue was washed with ether by decantation, and as much of it as possible transferred to the Gooch crucible on a glass triangle in the beaker. The residue of mercury adhering to the sides of the flask was treated with bromine water to remove the mercury as mercuric bromide. The mercuric bromide, together with excess of bromine water, was carefully poured through the Gooch crucible into a clean beaker, and the quantity of the bromine water in the beaker so adjusted that the level of the liquid in the beaker was below the bottom of the crucible. The continuous extraction of the mercury with bromine water was conducted as described above for carbon bisulphide.

When the reaction was complete, the flask was removed, and the bromine expelled on a water bath. The Gooch crucible and the glass stand were washed with rectified spirit and removed. The mercuric bromide in the beaker was dissolved by adding pure rectified spirit, the liquid filtered through glass wool, and the filtrate made up to a definite volume. The mercury in an aliquot portion of the solution was then precipitated and weighed as mercuric sulphide, as described in Method B (2).

Mercurial ointments analyzed by the sulphide method gave the following results:—Sample I, 20.51 per cent.; sample II, 31.84, 31.79 per cent.; sample III, 32.44, 32.29 per cent.

The values obtained when the mercury is estimated as mercuric bromide by evaporation are variable, being sometimes high and sometimes low.

DETERMINATION OF MERCURY IN GREY POWDER.—The powder gives a residue of mercury when treated with dilute hydrochloric acid. The mercury in the residue is converted into mercuric bromide and then determined as mercuric sulphide, as in the case of mercury ointment. Values obtained: 33.06, 33.14 per cent.

THE DETERMINATION OF FREE MERCURY IN MERCURY FULMINATE.—Mercury fulminate is treated with excess of potassium cyanide, and the residue filtered off in a Gooch crucible. The mercury in the Gooch crucible is extracted with bromine water, and the mercury precipitated as mercuric sulphide, as above described.

SUMMARY.—(A) Volumetric methods of determining mercuric bromide in alcoholic solutions are unreliable, but precipitation as silver bromide (other soluble bromides being absent) or as mercuric sulphide, with the use of a Gooch crucible, gave accurate results. The method of Moritz Kohn (reduction of mercuric bromide to metallic mercury by alkaline hydrogen peroxide and subsequent titration of the halide by Volhard's method) is fairly satisfactory. The results obtained were consistently a little high.

(B) Solutions of mercuric bromide in alcohol lose appreciable quantities of mercuric bromide on evaporation.

(C) The following method is proposed:—The main constituents of the substance containing free mercury are removed by extraction with a suitable solvent. The residue is treated with bromine water, and the mercuric bromide formed is dissolved in alcohol. It is then precipitated as mercuric sulphide, and the sulphide filtered off and weighed in a Gooch crucible. It is submitted that free mercury in a variety of commercial products may be determined accurately in this manner.

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MEDICAL AND PHARMACEUTICAL NOTES

THALLIUM.—W. E. Dixon ("Proceedings of the Royal Society of Medicine," June, 1927) communicates the results of an investigation into the alopecia which thallium, however administered, produces in man and animals. There is no other substance which acts like thallium in producing the characteristic alopecia in both men and animals. All animals, with the possible exception of the guinea-pig, when injected with thallium, lose their hair; the hair at first becomes less glossy, it is easily rubbed off, and later is shed. The alopecia begins on the nape of the neck and round the ears, and the last hairs to fall are those round the chin and nose. But besides this action thallium, in small doses, stimulates the growth of the hair. In order to

show this, two rabbits from the same litter were shaved on one or two areas; one animal was kept as a control and to the other thallium was administered. In the first animal there was no apparent growth of hair in the shaved areas. In the case of the other animal from the same litter, which after being shaved had received a dose of thallium, there was a distinct growth of new hair on the shaved parts. This is a characteristic result: the thallium whilst destroying the old hair, promotes the growth of new hair. In the animal the only effect noticed is that the hair falls out, that is, there are no other definite objective effects. Sections of the alopecia area show an epidermis almost normal; in the dermis there is an increased density of fibrous tissue, but the sebaceous follicles are normal; the collection of epithelial cells is smaller than usual, but the dividing cells show nothing abnormal. Interruption in the normal growth of the hair is due to failure of the process of transition from the large polygonal cells to the stratified cells forming the hair. The conclusion to be drawn from these experiments is that there is a considerable evidence that nerve injury may produce alopecia and that mental shock which is closely associated with the autonomic system may have a similar effect; also there are many cases of trigeminal neuralgia resulting in alopecia over the area affected. With thallium there are two unusual and remarkable effects associated with one drug: the production of alopecia and a definite effect on the autonomic nervous system. Since alopecia areata is frequently associated with nervous phenomena, it may not unwarrantably be suggested that the autonomic system has a great part in its causation. Thallium rubbed into the skin does not depilate, nor does it locally affect the blood-vessels; it is only after absorption that this metal affects the hair.—(Through *Chemist and Druggist.*)

A Possible Insulin Substitute.—P. T. Herring ("Lancet," I, 1927, page 1000) draws attention to a paper communicated to the Royal Society recently by Dr. Hynd from the department of Physiology, St. Andrews, which may turn out to be of considerable importance. Dr. Hynd has ascertained that glucosone or aldofructose, one of the oxidation products of glucose or fructose, produces when injected subcutaneously in mice a condition which is very similar to that produced by the injection of insulin. Similar oxidation products of maltose and lactose—maltosone and lactosone—are inactive, but on hydrolysis become active. Dr. Hynd suggests that glucosone is the

intermediate in carbohydrate metabolism which is normally formed, and that some at least of the symptoms produced by insulin are due to the production of glucosone in excess. The symptoms are modified by adrenalin and pituitrin as are those due to insulin. If Dr. Hynd's views are correct, it is possible that glucosone might be used in place of insulin, particularly as it can be taken by mouth.—(Through *Chemist and Druggist.*)

ARSENIC IN TOBACCO.—A hitherto unsuspected source of arsenic is pipe tobacco. Dr. Roe E. Remington of the North Dakota Agricultural College in a report to the American Chemical Society, told of a man who was excreting from three to four-tenths of a milligram of arsenic per day—a very large amount. He tried to find its source, and ultimately discovered that the man was an inveterate pipe-smoker. The analysis of pipe tobacco showed that various samples contained as much as a grain or a grain and a half per pound. If taken in one dose, that is enough arsenic to kill a man.

Since a large number of pipe smokers seem to be thriving, Dr. Remington's discovery does not appear particularly alarming, although further work may show that continued small doses of arsenic are harmful. He does not know the source of the arsenic in tobacco. It might come from the soil or from arsenic sprays.

About one ten-millionth of the body weight of human beings is arsenic. One investigator has found that Germans contain less of this element than other persons because pure food laws have been in existence longer and have been better enforced in Germany than elsewhere.

AVENYL—AN IMPORTANT NEW LEPROSY DRUG.—A decided advance towards a solution of the problem of treating leprosy complicated by the presence of a positive Wassermann reaction, is achieved by the introduction of "Avenyl" (2-myristoxymercuri-3-hydroxybenzaldehyde), a preparation which is the outcome of work in the Wellcome Chemical Research Laboratories. As the result of tests carried out under the Indian Research Fund Association and extending over two years a clinical report covering thirty cases has been issued. These cases lead to the conclusion that this drug is a most safe and effective remedy in the treatment of leprosy when the Wassermann reaction is positive. Hydnocarpus oil, acknowledged as one of the most import-

ant drugs in the treatment of leprosy, is used as the vehicle for this preparation of mercury and probably contributes to the favorable results.

Poison Ivy Remedies Simple and Effective.—Victims of poison ivy, poison oak and poison sumac can end their troubles very easily, according to James F. Couch of the U. S. Department of Agriculture.

"Just ask your druggist to make up a 5 per cent. solution of potassium permanganate," he says, "and swab it on the poisoned places with a bit of absorbent cotton or a soft cloth. The permanganate destroys the ivy poison but does no harm to the skin, except that it makes a brown stain. Most of us do not want to let this remain; and it can be removed by washing with a one per cent. solution of oxalic acid. Oxalic acid is a poison, so that if you are afraid of children getting hold of it, you may use instead a one per cent. solution of sodium bisulphite, or even just plain soap and water, though the latter is a bit slow in taking off the stain. If the skin has been very much broken by scratching or otherwise and is raw, the oxalic acid will cause a temporary stinging and soap and water is preferable for removing stains from such sensitive surfaces. If the skin is very tender the solution of potassium permanganate may be diluted with water before using."

The permanganate treatment is recommended only as a remedy for poisoning that has already taken place. Persons who know that they are likely to be poisoned may prevent the plants from harming them with a wash devised by Dr. James B. McNair of the Field Museum, Chicago. This consists of a five per cent. solution of ferric chloride in a fifty-fifty mixture of water and glycerin. This is to be washed on all exposed parts of the skin and allowed to dry there, before going where the dangerous weeds grow. The iron in the chemical combines wtih the poisonous principle of the ivy and changes it into a harmless, non-poisonous compound.

None of the remedies recommended by the two scientists have any patent or proprietary medicines in them. They are standard and well-known chemicals, and any druggist can make them up in a few minutes.—(*Science Service.*)

NEWS ITEMS AND PERSONAL NOTES

SNAKE WORK WINS AWARD—For his brilliant achievement in producing an antivenin or anti-snake-bite serum that is effective against all types of poisonous snakes usually found in North America, Dr. Afranio do Amaral has been awarded the John Scott bronze medal, also a prize of one thousand dollars.

The award is made annually, "for useful inventions for the use and benefit of mankind," by the Committee of Wills Hospital and the Board of City Trust of the City of Philadelphia.

Dr. Amaral is director of the Antivenin Institute of America, which is a division of the Mulford Biological Laboratories at Glenolden, Pa. We congratulate Dr. Amaral upon this recognition which he has so richly deserved.

C. A. POTTERFIELD, DECEASED.—C. A. Potterfield, sixty-eight years of age, one of the most widely known druggists in Charleston, died Thursday, June 9, at his home, 1303 Quarrier Street, Charleston, W. Va.

Mr. Potterfield was born at Harper's Ferry, W. Va., May 5, 1859. His father was sheriff of Jefferson County and took an official part in the trial of John Brown.

At the age of thirteen he went into business for himself. Buying a team of horses, he sold sewing machines along the Shenandoah Valley in Virginia. In 1877, he graduated from the Philadelphia College of Pharmacy and came to Charleston shortly afterwards going into the drug business with Ed Boggs in 1882.

After discontinuing partnership with Mr. Boggs he went into business with Frederck S. Thomas, whose death occurred fifteen years ago. He was one of the first stockholders of the United Drug Company, Boston, national organization of drug stores, being the one hundredth member.

In 1885 he was married to Miss Katie D. Blair, who died several months ago. He is survived by the following children: Mrs. Marcelline Andre, Mrs. Nina Smith and Garland Potterfield (also a P. C. P. & S. graduate, 1915), all of Charleston. Surviving sisters are: Mrs. Bettie Drew and Mrs. Cora Potterfield, of Charleston. He was a member of the Charleston lodge of Elks, No. 202.

Funeral services were held Sunday afternoon at three o'clock in the Sacred Heart Church and burial was made in Mt. Olivet Cemetery.

BOOK REVIEWS

TRANSACTIONS OF THE WAGNER FREE INSTITUTE OF SCIENCE OF PHILADELPHIA; THE BIOCHEMISTRY OF THE AMERICAN PITCHER PLANTS. J. S. Hepburn, E. Q. St. John, and F. M. Jones.

A monographical study begun 1914 by the senior author.

An interesting detailed report of previous work on the digestion and absorption, the pitcher liquor and the nectar, precedes the authors' own work.

The chemical study of the nectar disclosed the presence of fructose in Sarracenia flava and Darlingtonia Californica. The work with the pitcher liquor disclosed that (1) the volume varies widely being in average 1.08 cc.; (2) a change from acid to a neutral reaction occurs in the pitcher of several species upon the opening of the pitchers; (3) period and degree of stimulation, also time elapsed between stimulation and withdrawal of the pitcher contents were varied and no measurable effect upon the volume of the pitcher liquor was detected; (4) liquid foods, as milk and beef broth, stimulating a large area of the pitcher lining, produced more pitcher liquor than meat, raw or cooked, while egg white, cheese, casein, fibrin, produced no distinct effect. Dilute salt solution of potassium ferri and especially ferro cyanide produced abundant secretion in both closed and open pitchers; (5) there is a return of the pitcher contents to their normal neutral reaction upon introduction of dilute acid or alkali comparable to the behavior of the human stomach under somewhat similar conditions; (6) the surface tension of the pitcher liquor is considerably lower than water, thus likely explaining its effect upon certain insects; (7) while Darlingtonia Californica produces no protease, most of the Sarracenia secrete proteases, some acting best in the presence of dilute alkali, others best in dilute acid, that also nepenthes and cephalatus. representatives of other families of pitcher plants, secrete proteases in the pitcher liquor; (8) other enzymes are also present, *e. g.* diastase in traces in the closed pitcher of Darlingtonia Californica—invertase and probably lipase in the closed pitchers of Sarracenia flava; (9) reducing sugar was absent in a composite sample of closed pitcher liquor, that hydrogen sulphide was present in the contents of liquor of Darlingtonia under certain conditions, that lime was found to

exceed 4% of the ash in a compound sample; (10) the pitcher cavity and liquor of the closed pitcher is bacteriologically sterile, that liquor from open pitchers which had captured prey invariably contained bacteria of the proteolytic (protein-digesting) type; (11) the proteolytic products, formed by digestion of the prey are likely absorbed by the pitchers and are utilized for the nutrition of the plant, that phosphates and probably other mineral foods are absorbed and utilized in the same manner; (12) the chemical composition of the Sarracenia plants depends in part on the time of year at which they are gathered, that pitchers contained more moisture and less solids than the rhizomes, that protease was absent in the rhizomes.

A comprehensive bibliography (95 titles), 9 excellent illustrations, and a radiograph are included.

The work is a credit to the authors, and especially to Dr. Hepburn who has brought to it his broad continued interest in the life mechanism of those plants living on soil poor in nitrogen, yet benefiting from the rich nitrogenous food of animals, available to them through an ingenious adaptation.

ARNO VIEHOEVER.

ALLEN'S COMMERCIAL ORGANIC ANALYSIS. Vol. V, Fifth edition, revised and in part re-written. Edited by Samuel S. Sadtler, B. S., Elbert C. Lathrop, A. B., Ph. D., and C. Ainsworth Mitchell, M. A., F. I. C., x-700 pages. Philadelphia, P. Blakiston's Son & Co.

Revised and re-revised, this work still holds its place in the laboratory of those who work in the field of applied organic chemistry, or rather we should say in one of the many fields of that science, for its development has been so great and so comprehensive that many specialties have arisen within it. The founder of the work has long since passed away, but his impress is still evident. The title which the first issue bore was a happy one for it clearly and vividly described the scope of the work, a scope that was most desired by all chemists, since at that time little satisfactory information on applied organic chemistry was available in English. Many have, of course, been the changes since it came somewhat hesitatingly from the hand of the author, but nowithstanding the great increase in bulk and the vast amount of change in the processes, those who knew the first edition

can still recognize that hand and see that e'en in the ashes live the wonted fires.

The present volume contains articles by Messrs. Mitchell, Nierenstein, Tuttle, Cox, Caunce, Gardner, Mathewson, Hill, Davis. British and American specialists are included in the list. The subjects are : Tannins, inks of all types, amines and ammonium compounds, leather, natural colors, food colors, benzene and homologues, aniline and allies, naphthylamine, pyridine, quinoline, acridine bases, the last named accidentally printed "actridine" in the brief provisional list of contents.

It is not necessary to express the banal compliment that this book should find a place in every practising chemist's library. It will find its place for the sheer necessity that the chemist has for it. It is *primus inter pares,* and the revision is maintaining the standard, high as it was, set by the first issue.

HENRY LEFFMANN.

The Wellcome Foundation, Ltd., London, have submitted the following two publications for review:

THE WELLCOME HISTORICAL MEDICAL MUSEUM. 118 pages.

It is to the credit of America and American pharmacy that Henry S. Wellcome, a graduate of the P. C. P. in 1874, founded The Wellcome Historical Medical Museum in London in 1913. It is the result of collections made during many years in various parts of the world. It was inaugurated by the late Sir Norman Moore, then president of the Section of History of Medicine, which formed part of the XVII International Congress of Medicine held in August, 1913, in London. After closing for a few months for the purpose of re-arrangement, the museum was reopened on October 14, 1926, as a permanent institution, located at 54A Wigmore Street, London W. I., with L. W. G. Malcolm, M. S. C. (Cantab.), F. R. S. E. as conservator and Henry S. Wellcome as director.

The collections are international in character, and cover a wide field, including medicine, surgery, chemistry, pharmacy and the allied sciences. The museum is designated to represent the history of these various branches of the art of healing throughout the world, and their practice is illustrated by objects, instruments and appliances of historical interest, and by plastic and pictorial art. The handbook before

us is intended to indicate, in a general way, the chief features and objects exhibited in the museum.

The pharmaceutical section is housed on the ground floor, front, and represents the entire history of pharmacy and materia medica. The handbook devotes pages 73 to 80 with numerous excellent illustrations to the description of this section. The referee advises every pharmacist who is fortunate enough to go abroad to visit the Wellcome Historical Medical Museum and also to study the pharmaceutical section.

LISTER CENTENARY EXHIBITION AT THE WELLCOME HISTORICAL MEDICAL MUSEUM. 216 pages.

The centenary of the birth of the late Lord Lister, the "Father of Aseptic Surgery," on April 5, 1927, presented an opportunity to illustrate his achievements. For this reason the Lister Exhibition has been arranged in the Wellcome Historical Medical Museum, bringing together a representative selection of objects of scientific, medical and personal interest connected with his life and work. It is arranged as follows: Family life, professional life, experimental researches, experiments with antiseptics, original surgical work, associates in Great Britain and abroad, recognition by Great Britain and the scientific world and Lister Ward.

In the appendix, pages 176 to 197 are devoted to the opening ceremony of the Wellcome Historical Medical Museum on Tuesday, June 24, 1913, a very valuable reprint, which enhances the value of the volume. Needless to say, the handbook is profusely illustrated, including an excellent portrait of Lord Lister as president of the Royal Society.

OTTO RAUBENHEIMER, Ph. M.